

REMEDIAL ACTION PLAN

SMITHFIELD RSL PRECINCT

PREPARED FOR THE SMITHFIELD RSL CLUB

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Client:

Smithfield RSL Club
88 Smithfield Road,
Smithfield NSW 2164
Attention: Wesley Komorowski

Author: S. McCormack (B.E – civil, hons) – CEnvP (#928), MIEAust, NER (geotechnical & environmental)
(Contaminated Land Specialist No. SC40929)

Field Engineer/Scientist: --





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1 PROJECT INFORMATION

1.1 INTRODUCTION

Geo-Environmental Engineering Pty Ltd (GEE) was commissioned by the Smithfield RSL Club to prepare this Remedial Action Plan (RAP) for their land holding in Smithfield NSW which extends between Smithfield Road to the east, Neville Street to the north, O'Connell Street to the west and Brenan Street to the south and is herein referred to as the 'Smithfield RSL Precinct' or the 'Site'. A site location map is provided for reference as **Figure 1**.

The site covers an area of 43,171m² and encompasses the following legal allotments and active site addresses:

Lot	DP	Property Address
1	1254549	88 – 102 Smithfield Road
1	815265	45 Neville St
2	815265	43 Neville St
3	26819	41 Neville St
4	26819	39 Neville St
1	582485	37 Neville St
4	582485	37A Neville St
21	605517	35 Neville St
22	605517	35A Neville St
21	598459	33 Neville St
20	575281	31 Neville St
2	882031	13 O'Connell St
1	882031	11 O'Connell St
5	26819	7 O'Connell St
6	26819	5 O'Connell St
4	1059050	154 Brenan St
1	567165	152 Brenan St
2	567165	152A Brenan St
4	567165	150 Brenan St
3	567165	150A Brenan St
7	1037645	148 Brenan St

The location of each of the allotments/properties which form the site is shown on **Figure 2** along with a recent aerial photograph taken in November 2022.

The RAP was requested to support a state significant planning proposal for the Site which is expected to include:

- ◇ 468 apartments



- ◇ A hotel with 168 rooms
- ◇ The existing licensed club (unchanged)
- ◇ Retail space allowance of 391m² (say 4-6 shops)
- ◇ Medical centre space allowance of 485m²
- ◇ Commercial/business centre space allowance of 1,985m²
- ◇ All associated car parking

This RAP is based on information contained within a Detailed Site (contamination) Investigation (DSI) report (reference 1) and an earlier Preliminary Site (contamination) Investigation (PSI) report (reference 2), both of which were completed by GEE. The contamination requiring remediation relates to the presence of Asbestos Containing Material (ACM), in the form of fragments of fibrous cement sheeting, within filled ground and at the surface across parts of the site.

This RAP addresses the requirements for remediation and validation of the site to ensure that it will be suitable for the proposed land-use. The remediation strategy adopted in this RAP is the off-site removal and disposal of the ACM impacted soil, followed by validation of the surface soils and the provision of an asbestos clearance certificate to be issued by either an occupational hygienist or a licenced asbestos assessor.

Finally, the RAP has been prepared in accordance with relevant guidelines endorsed by the NSW Environment Protection Authority (EPA).

1.2 OBJECTIVES

The objectives of this RAP are to:

- ◇ Define the remedial goals that will ensure that the remediated site will be suitable for ongoing residential land-use,
- ◇ Document the remediation strategy and describe the remediation procedures to be implemented to reduce the contamination risk to an acceptable level for the land-use, including requirements for validating the remedial works,
- ◇ Establish the necessary environmental management procedures to be implemented during the proposed remedial works, and
- ◇ Identify any regulatory approvals or licences required by the proposed works.



1.3 SCOPE OF WORKS

The scope of this RAP is as follows:

- ◇ Identify the extent and type of contamination requiring remediation,
- ◇ Define the remediation goals and Remediation Acceptance Criteria (RAC),
- ◇ Evaluate the feasible remediation strategies and options,
- ◇ Detail the preferred remediation option for the site,
- ◇ Preparation of a validation plan to ensure that the RAC are achieved,
- ◇ Preparation of a Workplace Health & Safety (WHS) plan to minimise the risk of human exposure to contaminants, and
- ◇ Preparation of an environmental management plan to minimise the impact of remediation works on the surrounding environment.

Following the execution of the remediation process, a validation report will be prepared. The objective of the validation report is to describe the completed remedial works and determine whether the site has been remediated to a standard that is suitable for the proposed land-use.



2 SITE IDENTIFICATION

A summary of the site identification details is provided in **Table 1** below, while a site location map is provided as **Figure 1** and a plan showing the layout of the site including location of the allotments which form the site and the proposed development precincts, is provided as **Figure 2**. The site lies within the City of Fairfield Council and the coordinates for the middle of the site are approximately -33.855760 Latitude and 150.93608 Longitude.



Table 1: Site Identification Details

Lot	DP	Address	Area (m ²)	Current & Proposed Zoning ¹	Current Use	Proposed Use (Refer to Figure 2)
1	1254549	88 – 102 Smithfield Rd	20,709	RE2 – Private Recreation	RSL Club and Parking	Precinct 1 & 4
1	815265	45 Neville St	588		Low Density Residential	Precinct 2
2	815265	43 Neville St	497		Low Density Residential	Precinct 2
3	26819	41 Neville St	1,061		Low Density Residential	Precinct 2
4	26819	39 Neville St	993		Residential / RSL Club Workshop	Precinct 2
1	582485	37 Neville St	620		Vacant	Precinct 2
4	582485	37A Neville St	1,456		Vacant	Precinct 2 & Road
21	605517	35 Neville St	938		RSL Club Parking	Precinct 2
22	605517	35A Neville St	1,174		RSL Club Parking	Precinct 2 & Road
21	598459	33 Neville St	2,037		RSL Club Parking	Precinct 2
20	575281	31 Neville St	2,072		RSL Club Parking	Precinct 1 & Road
2	882031	13 O'Connell St	478		Low Density Residential	Precinct 2
1	882031	11 O'Connell St	532		Low Density Residential	Precinct 2
5	26819	7 O'Connell St	896		Vacant	Precinct 2
6	26819	5 O'Connell St	912		Low Density Residential	Road
4	1059050	154 Brenan St	2,054	R3 – Medium Density Residential	Vacant	Precinct 3
1	567165	152 Brenan St	666		Low Density Residential	Precinct 3
2	567165	152A Brenan St	1,396		Vacant / RSL Club Parking	Precinct 3
4	567165	150 Brenan St	672		Low Density Residential	Precinct 3
3	567165	150A Brenan St	1,347		Vacant / RSL Club Parking	Precinct 3
7	1037645	148 Brenan St	2,060		Vacant / RSL Club Parking	Precinct 3
Total Area			43,171			



3 PREVIOUS INVESTIGATIONS

3.1 PRELIMINARY SITE CONTAMINATION INVESTIGATION

GEE completed a PSI for the site (reference 2) with the aim of identifying past and present contaminating activities, potential contamination types and to assess the need for further investigation. The scope of works for the PSI included:

- ◇ Review of the history of the site and surrounding land to provide an understanding of past and present site activities which in turn may indicate sources and areas of potential contamination as well as potential chemicals of concern,
- ◇ Review of the environmental and physical setting in which the site lies, and
- ◇ Detailed site inspection for potential sources of contamination.

A summary of the site history information obtained from this report is provided in Section 3 of this report, while a summary of the environmental and physical setting of the site is detailed in Section 4. Additionally, based on our review of this information, GEE has completed a Conceptual Site Model which has since been updated and is presented in Section 6.

3.2 DETAILED SITE CONTAMINATION INVESTIGATION

GEE completed a Detailed Site Contamination Investigation of the site (reference 1) that included:

- ◇ Review of the previous PSI report,
- ◇ Completion of another site inspection for any new potential sources of contamination,
- ◇ Field investigations including:
 - Field investigations including the drilling of 56 boreholes, and the excavation of 28 testpits across the site to provide even coverage and to target areas of environmental concern, and
 - Sampling of soil from the boreholes and testpits.
- ◇ Laboratory analysis of selected soil samples for contaminants of concern identified by the PSI,
- ◇ Preparation of a report.



The locations of the boreholes are shown on **Figure 3** and **Figure 4**, while the borehole and testpit logs are provided for referencing **Appendix B**.

A summary of the information obtained from this investigation is reiterated herein in Section 5, and based the results of this investigation, GEE has completed an updated Conceptual Site Model which is presented in Section 6.



4 SITE HISTORY

The history of the site and the surrounding area was researched as part of the PSI and a summary is reiterated below.

4.1.1 88-102 Smithfield Road (Lot 1 DP1254549 Existing RSL Club)

This allotment, which encompasses the existing RSL Club, was formed in 1999 by amalgamating 15 smaller allotments which were progressively purchased by the Club. Prior to being acquired by the RSL Club, the smaller parcels of land were owned by various individuals and a review of aerial photographs revealed that they predominately comprised rural/residential land holdings with some of the land in the north-eastern corner cultivated. The exception was in the north-eastern corner where there was once a corner-store / grocery.

As mentioned on the Smithfield RSL club website, the club was initially founded in the 1950s when the late Norman McCarthy gave the sub-branch and triangular block of land in the north-eastern portion of this allotment on which the current Bar360 Sports stands. The RSL club, or its subsidiaries, formally acquired the first parcel of land in 1957, with the remaining parcels of land acquired between 1959 and 1970.

By 1965, the RSL had significantly expanded to the west with two bowling greens and an openair carpark with access from Smithfield Road. By 1970 another openair carpark was constructed in the north-eastern corner, replacing the original corner store building(s). By 1978, the entire allotment was occupied by the RSL club, with two new bowling greens constructed in the south-eastern part of the allotment, replacing one of the original bowling greens. A new openair carpark was also established in the north-western corner.

Between 1978 and 1982, the other original bowling green fronting Neville Street was replaced by an expanded carpark. The next significant change occurred between 1986 and 1991 when the clubhouse expanded to the north-east. The two bowling greens in the southern part of the allotment were replaced between 2005 and 2011 by more carparking and this carpark was extended into the southern corner of this between 2018 and 2023.



4.1.2 31 Neville Street (Lot 20 DP575281)

This allotment was purchased by the RSL club in 1973 and before this it was a rural / residential parcel of land with a house and a shed/garage at the northern end fronting Neville Street and potentially used as a small poultry farm.

Soon after the RSL purchased the land, the original structures were demolished and replaced by a larger dwelling which occupied the northern half of the allotment. The remainder of the property was covered by grass with some trees. In 2022, this dwelling and any associated structures were demolished and cleared when the RSL club constructed a new openair asphalt paved carpark (**Figure 2**).

4.1.3 33 Neville Street (Lot 21 DP598459)

This allotment was purchased by the RSL club in 1978 and before this it was a rural / residential parcel of land with a house and a shed/garage at the northern end fronting Neville Street and a tree in the middle of the rear yard.

Soon after the RSL purchased the land, the original structures were demolished, and the land became joined with the adjoining property of 31 Neville Street. It remained undeveloped except for a driveway and parking area in the northern half of the property. In 2022, this property was redeveloped (along with surrounding land) into a new openair asphalt paved carpark (**Figure 2**).

4.1.4 35 and 35a Neville Street (Lot 21 and 22 DP605517)

These two allotments were initially part of a larger rural / residential parcel of land with a small house and a detached shed/garage at the northern end adjacent to Neville Street. In 1974 the property was subdivided it into the current allotments and soon thereafter a new dwelling was constructed on the northern property (No. 35).

The Smithfield RSL acquired No. 35 in 1990 and No. 35a in 1999 then between 2005 and 2011, the former dwellings and associated structured were demolished and cleared from site. The land remained undeveloped until 2022 when an openair asphalt paved carpark was constructed which covered No. 35a and the southern part of No. 35 (**Figure 2**). The northern portion of No. 35 was disturbed during this construction work and remains as such.



4.1.5 37 and 37a Neville Street (Lot 1 and 4 DP582484)

These two allotments were initially part of a larger two rural / residential parcels of land that was not developed. In 1974 the property was subdivided it into the current allotments and new dwellings being constructed on each of the new allotments.

The Smithfield RSL acquired No. 37 in 2003 and No. 37a in 1999 then between 2005 and 2011, the former two dwellings and associated structured were demolished and cleared from site. In 2022, soil originating from earthworks associated with the adjoining carpark was the placed across part of these allotments (**Figure 4**). Around the same time, some soil stockpiles were placed on the northern part of this property with the stockpiles extending into No. 39 Neville Street.

4.1.6 39 Neville Street (Lot 1 DP582485)

This allotment was formed in the 1950s after subdivision from a larger parcel of rural/residential land on the corner of Neville and O'Connell Streets. Soon after subdivision, a house was constructed in the northern portion of the property and by 1970 along with associated smaller structures / sheds.

This allotment was acquired by the RSL club in 1994 and in the mid-2000s the original dwelling was demolished. A relatively new shed that was constructed in the early 2000s, and an older garage were not demolished and remain the only structures on the property. Based on our site inspection, the shed is used by the RSL Club as a workshop and the garage for storage.

Of particular importance to this investigation was the placement of a soil stockpile on the northern part of this property (and extending onto No. 37 Neville Street) in 2022. The stockpile has been labelled as SP-D and is shown on **Figure 4**.

4.1.7 41 Neville Street (Lot 1 DP582485)

This allotment was formed in the 1950s after subdivision from a larger parcel of rural/residential land on the corner of Neville and O'Connell Streets. After this subdivision, the land remained undeveloped until the early 1960s when a house was constructed in the northern portion of the property. By 1970 some other smaller structures (e.g. garage and shed) were added to the property.

This allotment was acquired by the RSL club in 2003 and soon thereafter the rear half of the property was cleared on any structures and separated by a fence. The



northern half remained relatively unchanged with continued use as a residence. On the rear half of this parcel of land a new shed was erected, and the land opened up to the surrounding RSL owned land to the east and south.

4.1.8 43 Neville Street (Lot 2 DP815265)

This allotment was formed in the 1950s after subdivision from a larger parcel of rural/residential land on the corner of Neville and O'Connell Streets. After subdivision, the land remained undeveloped until the early 1960s when a house was constructed in the northern portion of the property and then expanded in the 1970s. Since then, the residential property has remained relatively unchanged, although it was acquired by the RSL club in 2016.

4.1.9 45 Neville Street (Lot 2 DP815265)

This allotment was formed in the 1950s after subdivision from a larger parcel of rural/residential land on the corner of Neville and O'Connell Streets. Soon after subdivision, a house was constructed in the northern portion of the property along with smaller structures (i.e. sheds / garages). Since then, the residential property has remained relatively unchanged although it was acquired by the RSL club in 2016.

4.1.10 5 O'Connell Street (Lot 6 DP26819)

This allotment was formed in the 1950s after subdivision from a larger parcel of rural/residential land on the corner of Neville and O'Connell Streets. Soon after subdivision, a house was constructed in the western portion of the property along with smaller structures (i.e. sheds / garages) at the rear. Since then, the residential property has remained relatively unchanged although it was recently acquired by the RSL club in 2022.

4.1.11 7 O'Connell Street (Lot 5 DP26819)

This allotment was formed in the 1950s after subdivision from a larger parcel of rural/residential land on the corner of Neville and O'Connell Streets. Soon after subdivision, a house was constructed centrally on the property along with smaller structures (i.e. sheds / garages) at the rear.

The RSL Club acquired the land in 2000 and soon thereafter they demolished the dwelling and other smaller structures. Since then, the site has remained a vacant and undeveloped parcel of land.



Of particular importance to this investigation was the placement of soil stockpiles on this property in 2022. Anecdotal information from a representative of the club has revealed that the stockpiles were from a former garden in the southern corner of the RSL club property (Lot 1 DP1254549) when replaced by a carpark and this is supported by the aerial photographs. The stockpiles have been labelled herein as SP-A, SP-B and SP-C and their locations are shown on **Figure 4**.

4.1.12 11 and 13 O'Connell Street (Lots 1 & 2 DP882031)

These two allotments were once combined and formed in the 1950s after subdivision from an even larger parcel of rural/residential land on the corner of Neville and O'Connell Streets. Soon after the 1950s subdivision, a house and a detached garage was constructed in the northern half (No. 13) while the southern half (No. 11) remained undeveloped.

The existing two allotments were then formed by an additional subdivision in the early 1990s and soon thereafter another house was constructed on No.11. The RSL Club then acquired No. 13 in 1999 and No. 11 in 2000 but since then these residential properties have remained relatively unchanged.

4.1.13 148 Brenan Street (Lot 7 DP1037645)

This allotment was originally formed in the 1950s after subdivision from a larger parcel of rural/residential land fronting Brenan Street. The property remained undeveloped until soon after subdivision when a house and a detached garage was constructed at the southern end.

The RSL Club acquired the property in 2022 and soon thereafter demolished the dwelling and associated structures. The Club then constructed an asphalt paved carpark that encompassed the northern portion of this allotment and land beyond. Of particular importance to this investigation, soil originating from earthworks associated with this carpark was placed across the remainder of this allotment.

4.1.14 150, 150A, 152, 152A Brenan Street (Lots 1 to 4 DP567165)

These four existing allotments were created in the early 1970s by subdivision of two adjoining residential / rural allotments, with 150A and 152A at the rear (northern end) of 150 and 152, respectively. Prior to subdivision there was a house and associated structures at the southern end of each of the original two allotments.



Soon after the allotments were created, a new house and associated structures were constructed on No. 152A, while No. 150A remained undeveloped after the RSL club purchased the land in 1979. No. 152A was acquired by the RSL Club in 2019 and in 2022, the RSL Club constructed an asphalt paved carpark that encompassed the northern portion of these two allotments and land beyond. Of particular importance to this investigation, soil originating from earthworks associated with this carpark was placed across the remainder of these allotments.

At the time of obtaining the land title records, both 150 and 152, which still have houses and associated structures on them, were not owned by the RSL Club. However, GEE understands that No. 150 has since been purchased by the RSL Club and the acquisition of No. 152 by the Club is imminent.

4.1.15 154 Brenan Street (Lot 4 DP1059050)

This allotment was originally formed in the 1970s after subdivision from a larger parcel of rural/residential land fronting Brenan Street. Soon thereafter, a dwelling and a detached garage was constructed at the southern end of the property while the rear of the property appeared to have been cultivated as part of a market garden (or similar).

The RSL Club acquired the property in 2003 and soon thereafter demolished the dwelling and associated structures. The land remained undeveloped, although in 2022, soil from the recently constructed carpark to the north-east was placed across this allotment.

4.1.16 Surrounding Land

Surrounding land and land-use activities have the potential to cause contamination of the site via groundwater or surface water migration. Notwithstanding this, the available historical information did not reveal any significantly contaminating activities associated with the surrounding land. Like the site, the surrounding land was originally dominated by predominately large scale rural agricultural land and over time there has been a transition to smaller scale and predominately residential properties.



5 SITE CONDITION AND SURROUNDING ENVIRONMENT

This section provides a summary of the site features and surrounding environment and has been extracted from the PSI and DSI reports (references 2 and 1).

5.1 SITE DESCRIPTION

The site description has been separated into parts of the site with the locations shown on **Figure 2**.

5.1.1 88-102 Smithfield Road (Lot 1 DP1254549 Existing RSL Club)

This part of the site was occupied by the existing Smithfield RSL Club and its associated carparking areas. The Club building occupies most of the eastern half of this allotment with the exception being a small open-air carpark in the north-eastern corner and a driveway / loading dock along the northern boundary adjacent to Neville Street. The western half of this allotment was predominately covered by open-air carparks with some minor garden areas.



Plate 1: Drone image of the Smithfield RSL Club looking to the east (source: Benson McCormack Architects).



Plate 2: View towards the east from the carpark towards the RSL Club building.



Plate 3: View towards the east along the northern side of the RSL Club Building. Driveway and loading dock.



Plate 4: View towards the west along the northern side of the RSL Club Building. Driveway and loading dock.

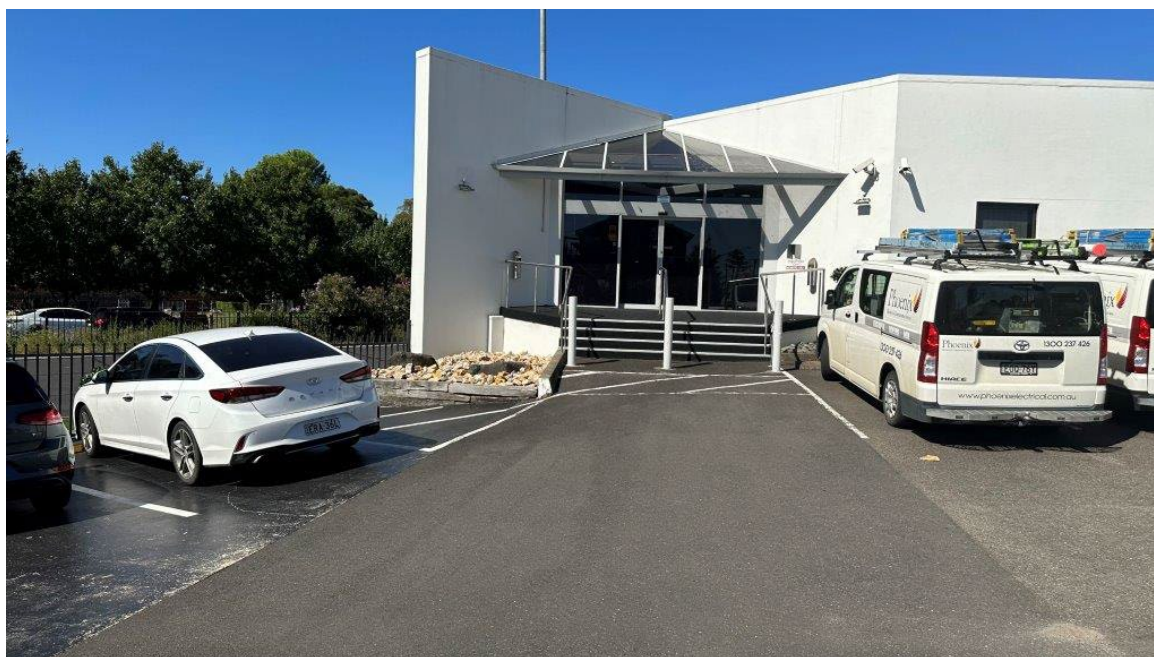


Plate 5: View towards the south showing the north-eastern corner carpark and the corner of the RSL Club building.



Plate 6: View towards the south-west along the Smithfield Road, frontage.



Plate 7: View towards the north-east along the Smithfield Road, frontage.



Plate 8: View towards the south across the open-air carparking areas.



Plate 9: View towards the north across the open-air carparking areas.

5.1.2 31, 33, 35 & 35a Neville Street (Lot 20 DP575281, Lot 21 DP598459, Lot 21 and 22 DP605517)

These allotments were predominately occupied by a recently constructed open-air and asphalt paved, carpark. The exception was at the northern end, adjoining Neville Street which had disturbed soils at the surface, including a few fragments of ACM in



the form of bonded fibrous cement sheeting. The extent of ACM impacted soil is shown on **Figure 5**.



Plate 10: View towards the north across the recently constructed carpark.

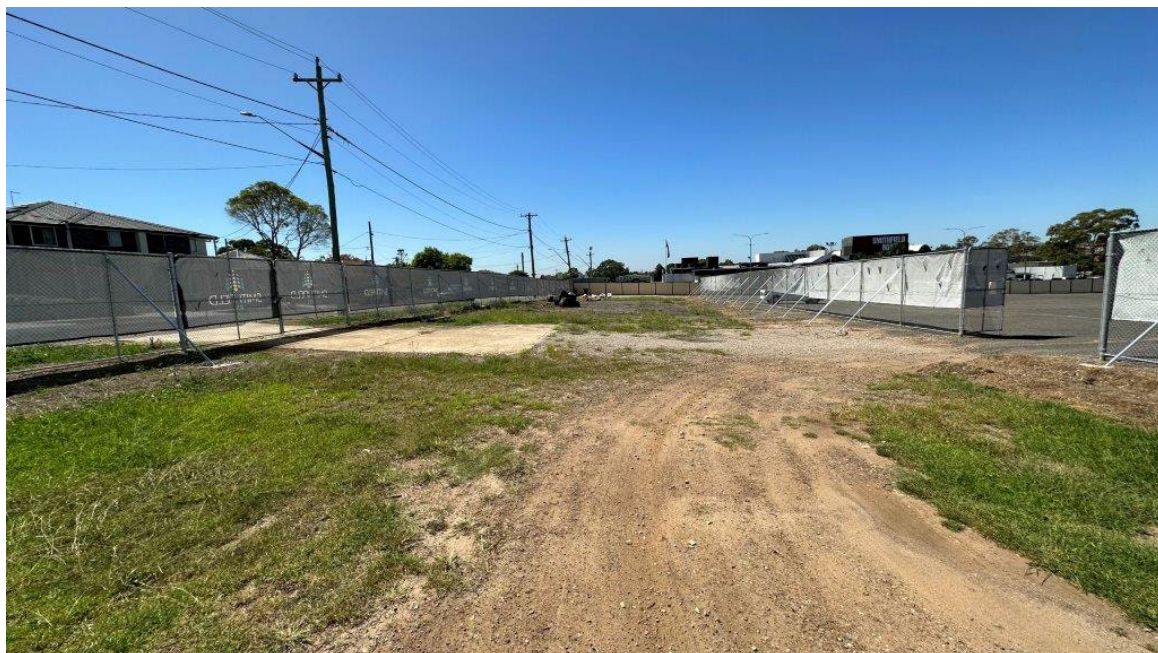


Plate 11: View towards the east across the northern end of 21, 33 and 35 Neville Street.



Plate 12: Aerial view of the recently constructed carpark, looking west (source: Benson McCormack Architects).





Plate 13: Example of potential ACM observed on the surface in this part of the site.

5.1.3 37 and 37a Neville Street (Lot 1 and 4 DP582484)

These two properties/allotments were vacant and undeveloped parcels of land. Much of the southern allotment (No. 37a) has been filled to a depth of up to approximately 1m with the fill understood to have originated from earthworks associated with the recently constructed carpark on land to the east. Our walkover inspection identified several fragments of Asbestos Containing Material (ACM) in the form of bonded fibrous cement sheeting associated with this filled ground and there were also several fragments of ACM on the surface beyond the filled ground. The extent of ACM impacted filling and surface ACM across these allotments is shown on **Figure 5**.

The northern allotment was also partially filled with the remainder of the surface disturbed from the recent earthworks. There were also some stockpiles of soil in the north-western corner which extended across land immediately to the west (39 Neville Street). No visible potential ACM was observed across the surface of the stockpiles which typically comprised silty sand with organics and minor anthropogenic inclusions.



Plate 14: View towards the west across the northern end of No. 37 and 39 Neville Streets with soil stockpiles visible.

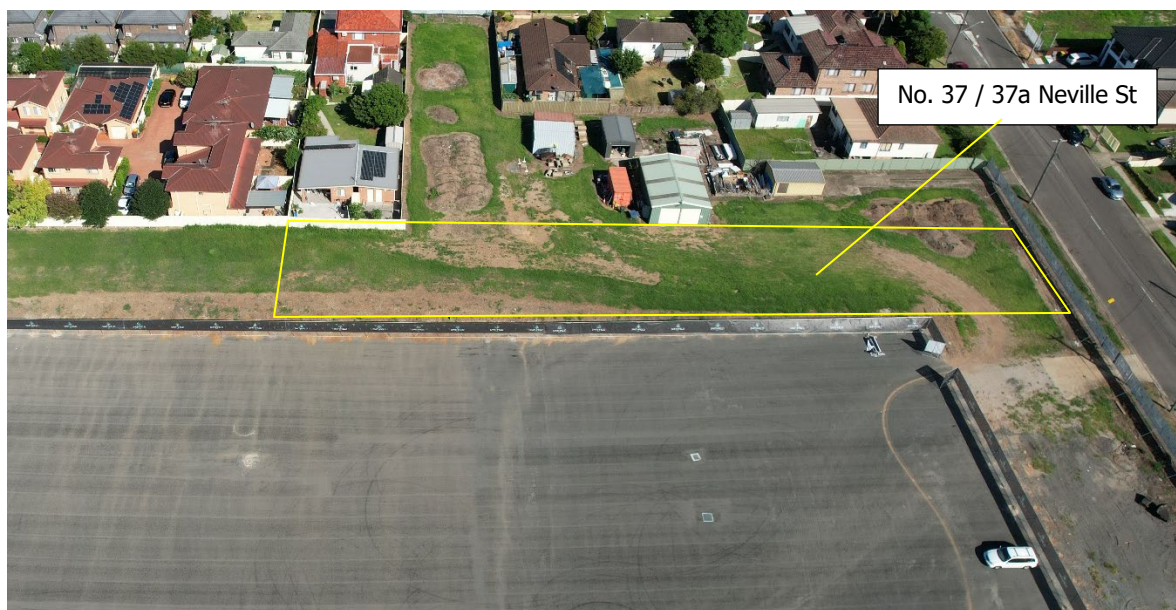


Plate 15: Aerial view of the 37 and 37a Neville Street, looking west (source: Benson McCormack Architects).



Plate 16: View towards the south across No. 37 and 37a Neville Street.



Plate 17: View towards the north across No. 37 and 37a Neville Street.



Plate 18: Example of potential ACM observed on the surface in this part of the site.



5.1.4 39 Neville Street (Lot 1 DP582485)

At the time of this investigation there were two metal garages/sheds and a metal shipping container occupying the southern half of this property. In the north-western corner was a concrete driveway linking one of the garages/sheds with Neville Street. The remainder of the land was predominately grassed except for some soil stockpiles in the northern part of the property which also extended to the east onto No. 37 Neville Street. No visible potential ACM was observed across the surface of the stockpiles which typically comprised silty sand with organics and minor anthropogenic inclusions. However, some ACM was observed on disturbed ground at the rear (southern end) of this allotment. The extent of disturbed ground with surface fragments of ACM is shown on **Figure 5** and extends across land to the east and west.



Plate 19: Aerial view of the 39 Neville Street, looking west (source: Benson McCormack Architects).



Plate 20: View towards the south across 39 Neville Street.



Plate 21: View towards the west showing a general storage area on a concrete slab in the middle of 39 Neville Street.



Plate 22: View towards the east showing the soil stockpiles on the northern end of No. 39 Neville Street.



Plate 23: Example of potential ACM observed on the surface in this part of the site.



5.1.5 41 Neville Street (Lot 1 DP582485)

At the northern half of this property was a single storey, fibro-clad, dwelling with a tile and metal roof. Immediately to the south of the dwelling and along the western property boundary was a detached fibro shed and a metal shed.

The rear (southern half) of this property was being used by the RSL Club and included a detached metal storage shed, an older corrugated iron clad storage shed and a metal shipping container. The modern shed and shipping container was being used for general storage of equipment for the RSL Club, while the older corrugated iron clad shed was being used to store paint cans and associated equipment. Both sheds had a concrete floor slab. Scattered around the sheds and shipping container are piles of construction equipment and other waste debris, including a few fragments of ACM in the form of bonded fibrous cement sheeting. The extent of disturbed ground with surface fragments of potential ACM is shown on **Figure 5**.



Plate 24: Aerial view of the 41 Neville Street, looking west (source: Benson McCormack Architects).



Plate 25: View towards the north-west showing the dwelling at the northern end of No. 41 Neville Street.



Plate 26: View towards the south-west showing the rear yard and sheds of the dwelling on No. 41 Neville Street.



Plate 27: View towards the north-east across the rear half of No. 41 Neville Street showing scattered waste debris and two sheds in the background.



Plate 28: View towards the south across the rear half of No. 41 Neville Street showing scattered waste debris and one of the detached metals sheds and part of the shipping container.



Plate 29: View inside the modern storage shed on No. 41 Neville Street.

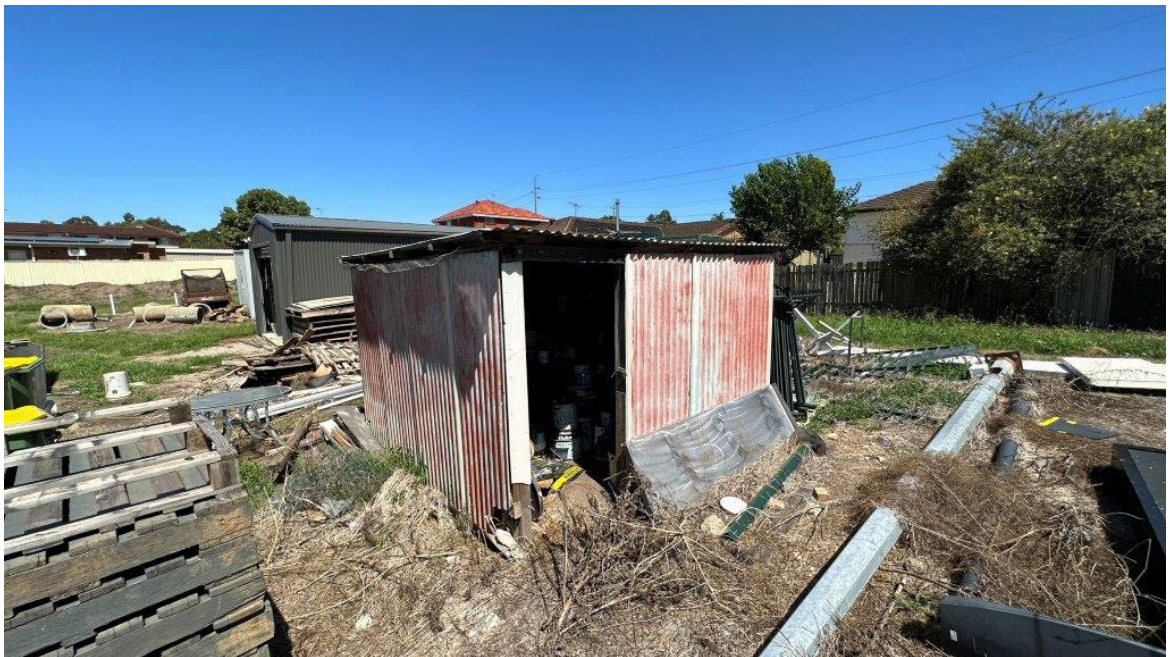


Plate 30: View towards the south-west showing the corrugated iron shed at the rear of No. 41 Neville Street.



Plate 31: View inside the corrugated iron shed at the rear of No. 41 Neville Street.



Plate 32: Example of potential ACM at the rear of No. 41 Neville Street.



5.1.6 43 Neville Street (Lot 2 DP815265)

This property was occupied by a two-storey brick dwelling with internal garage and a tiled roof. The front yard predominately comprised a brick paved driveway, linking Neville Street to the internal garage, while there were some garden beds around the perimeter. In the rear yard was a small metal storage shed, while the remainder of the yard was predominately covered by grass.



Plate 33: View to the south showing the front of No. 43 Neville Street.

5.1.7 45 Neville Street (Lot 2 DP815265)

This property is located in the north-western corner of the site and was occupied by a single storey fibro clad dwelling with a tiled roof. There was also a detached fibro clad garage in the rear (southern) yard. The remainder of the site was predominately covered by grass with the occasional garden beds and trees.



Plate 34: View to the south-east showing the front of No. 45 Neville Street.



Plate 35: View to the east showing the western boundary of No. 45 Neville Street.

5.1.8 5 O'Connell Street (Lot 6 DP26819)

At the front (western end) of this property was a two-storey brick dwelling with an internal garage and a tiled roof. At the rear was a single storey secondary dwelling clad in brick and with a metal roof. Between the two dwellings was smaller detached, fibro-clad dwelling. The front yard was dominated by a concrete paved driveway,



while the remainder of the site was predominately covered by grass with the occasional garden beds and small trees.



Plate 37: View to the south showing the front yard of No. 5 O'Connell Street.



Plate 38: View to the north showing the small fibro dwelling in the middle of the site.



5.1.9 7 O'Connell Street (Lot 5 DP26819)

At the front (western end) of this property was a two-storey brick dwelling with an internal garage and a tiled roof. At the rear was a single storey secondary dwelling clad in brick and with a metal roof. Between the two dwellings was smaller detached, fibro-clad dwelling. The front yard was dominated by a concrete paved driveway, while the remainder of the site was predominately covered by grass with the occasional garden beds and small trees.



Plate 36: View to the south showing the front yard of No. 5 O'Connell Street.



Plate 37: View to the north showing the small fibro dwelling in the middle of the site.

5.1.10 7 O'Connell Street (Lot 5 DP26819)

This property was a vacant and undeveloped parcel of land predominately covered by grass. There were also numerous soil stockpiles present. Anecdotal information from a representative of the club has revealed that the stockpiles were from a former garden in the southern corner of the RSL club property (Lot 1 DP1254549) when replaced by a carpark and this is supported by the aerial photographs. A walkover inspection of the stockpiles did not reveal any obvious potential ACM and the soil was predominately silty sand with minor organics and minor anthropogenic inclusions. However, some potential ACM was observed on disturbed ground at the rear (eastern end) of this allotment. The extent of disturbed ground with surface fragments of potential ACM is shown on **Figure 4** and extends across land to the north (No. 39 & 41 Neville St).



Plate 38: View to the east across No. 7 O'Connell Street.

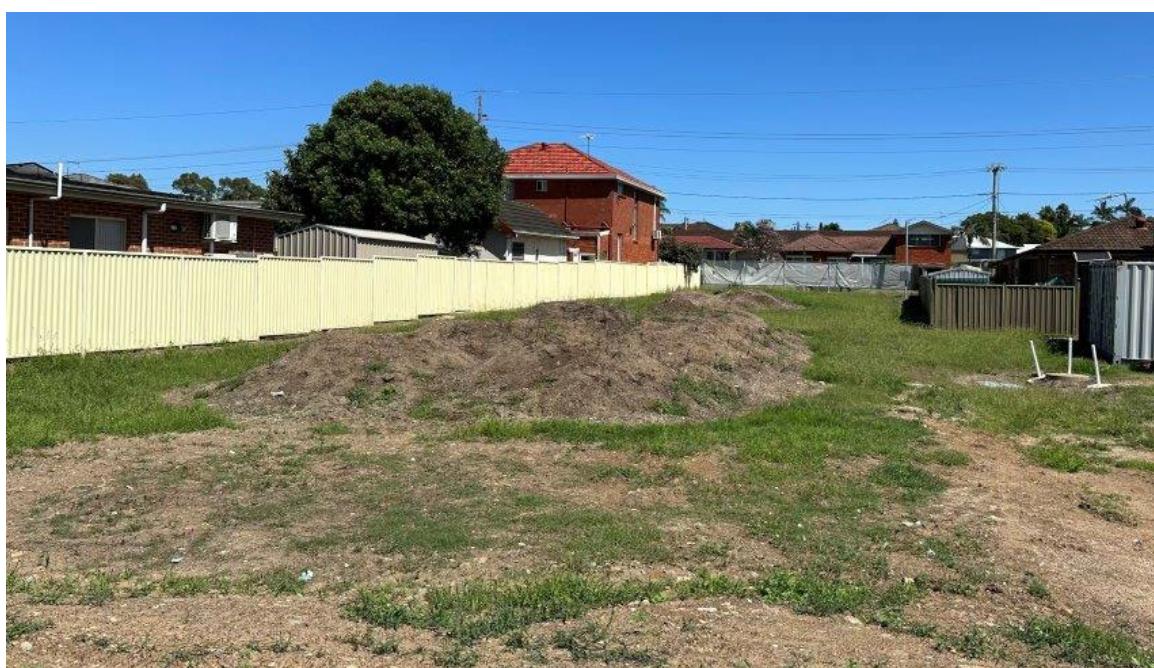


Plate 39: View to the west across No. 7 O'Connell Street.

5.1.11 11 O'Connell Street (Lot 1 DP882031)

This property was occupied by a single storey, brick dwelling with a tiled roof. A metal carport and some sheds were present along the property's southern boundary, while the remainder of the site was predominately covered by grass with the occasional garden beds and small trees.



Plate 40: View to the east showing the front of No. 11 O'Connell Street.

5.1.12 13 O'Connell Street (Lot 2 DP882031)

This property was occupied by a single storey fibro clad dwelling with a tiled roof. There was also a detached metal shed in the rear yard, while the remainder of the site was predominately covered by grass with the occasional garden beds and trees.



Plate 41: View to the North-east showing the front of No. 13 O'Connell Street.



Plate 42: View towards the west across the rear yard of No. 13 O'Connell Street.

5.1.13 148 Brenan Street (Lot 7 DP1037645)

This property/allotment comprises a vacant and undeveloped parcel of land. The northern portion of the property forms part of a recently constructed open-air, asphalt paved car park. The remainder of the property has been filled to a depth of up to approximately 1m. The fill is understood to have originated from earthworks associated with the adjoining carpark and our walkover inspection identified several fragments of potential Asbestos Containing Material (ACM) in the form of bonded fibrous cement sheeting.



Plate 43: Aerial view of 148 Brenan Street, looking south (source: Benson McCormack Architects).



Plate 44: View towards the north across No. 148 Brenan Street.



Plate 45: View towards the west across the rear of No. 148, 150a and 152a Brennan Street, showing the recently completed carpark.





Plate 46: Example of potential ACM observed on the surface in this part of the site.

5.1.14 150a and 152a Brenan Street (Lots 2 and 3 DP567165)

Both of these properties were vacant and undeveloped parcels of land. The northern portion of these properties form part of a recently constructed open-air, asphalt paved car park. The remainder of the property has been filled to a depth of up to approximately 1m. The fill is understood to have originated from earthworks associated with the adjoining carpark and our walkover inspection identified several fragments of potential Asbestos Containing Material (ACM) in the form of bonded fibrous cement sheeting.



Plate 47: Aerial view of 150a and 152a Brenan Street, looking south (source: Benson McCormack Architects).



Plate 48: View towards the west across the middle of 150a and 152a Brenan Street.



Plate 49: Example of potential ACM observed on the surface of 150a Brenan Street.



Plate 50: Example of potential ACM observed on the surface of 152a Brennan Street.



5.1.15 150 Brenan Street (Lot 4 DP567165)

At the front (southern end) of this property was a two-storey brick dwelling with an internal garage and a tiled roof. At the rear was a single storey secondary dwelling clad in brick and with a tiled roof. The front yard was dominated by a concrete and brick paved driveway, while the remainder of the site was predominately covered by grass with the occasional garden beds and small trees.



Plate 51: Aerial view of 150 Brenan Street, looking south (source: Benson McCormack Architects).





Plate 52: View towards the north showing the front of No. 150 Brenan Street.

5.1.16 152 Brenan Street (Lot 1 DP567165)

At the front (southern end) of this property was a single-storey brick dwelling with an attached metal carport on the eastern side. In the rear, north-eastern corner was a fibro clad secondary dwelling and, in the rear, north-western corner was a fibro clad shed and metal awning. The front yard comprised a brick paved driveway with some garden beds, while the remainder of the site was predominately covered by grass.



Plate 53: Aerial view of 152 Brenan Street, looking south (source: Benson McCormack Architects).



Plate 54: View towards the north showing the front of No. 152 Brenan Street.

5.1.17 154 Brenan Street (Lot 4 DP1059050)

This property/allotment comprises a vacant and undeveloped parcel of land. Of particular significance to this investigation is the fact that most of this property has been filled to a depth of up to approximately 1m. The fill is understood to have originated from earthworks associated with the recently constructed carpark adjoining these allotments and our walkover inspection identified several fragments of potential Asbestos Containing Material (ACM) in the form of bonded fibrous cement sheeting.



Plate 55: Aerial view of 154 Brenan Street, looking south (source: Benson McCormack Architects).



Plate 56: View towards the north showing across No. 154 Brenan Street.



Plate 57: Example of potential ACM observed on the surface in this part of the site.



5.2 SURROUNDING LAND USES AND ACTIVITIES

Surrounding land uses observed from the aerial photographs and our site inspection are summarised below:

- ◇ North: Predominately low-density residential. The exception was a primary school to the north-east and north-west.
- ◇ South: Brennan Park.
- ◇ East: Residential.
- ◇ West: Residential.

In summary, the surrounding land-uses were relatively benign from a site contamination perspective.

5.3 TOPOGRAPHY

The site is located on across a gentle, south-easterly dipping hillslope of less than 10% average grade. According to the Prospect topographical map (reference 5) suggests that the surface elevation is between approximately 25m and 35m above Australian Height Datum (AHD).

5.4 GEOLOGY AND SOILS

5.4.1 Regional

A review of the regional 1:100,000 geological maps (reference 6) indicates that the site is underlain by the Late Triassic aged Bringelly Shale formation of the Wianamatta Group which typically consists of shale, carbonaceous claystone, laminite and coal in parts.

A review of the regional soil maps (reference 7) indicates that the site lies over the following soil landscape group:

- ◇ Blacktown (9029bt) – This soil group is associated with gently undulating rises on the underlying shale formation. Local reliefs are up to 30m and slopes are usually less than 5% in gradient. Soils of the Blacktown Group typically comprise heavy clays that have been derived from the weathering process of shale bedrock, have low fertility and are often strongly acidic.



5.4.2 Site Specific

The subsurface conditions, as observed in all the boreholes and testpits, typically comprised a layer of topsoil and/or fill material over natural silty clay and/or gravelly clay soil. The depth of fill varied from 0.1m and 1.6m below ground surface, with an average of just over 0.5m. More detailed descriptions of subsurface conditions at these boreholes and testpit locations are provided in **Appendix B**.

5.5 REGIONAL HYDROGEOLOGY / GROUNDWATER

5.5.1 Regional

The regional and permanent groundwater in the vicinity of the site is expected to be confined, or partly confined, within discrete water-bearing zones within the bedrock formation. However, intermittent 'perched' water seepage is likely to occur at the soil-bedrock interface following heavy and prolonged rainfall events.

Permanent groundwater associated with the Wianamatta group of Shale bedrock is characterised by high salinity (reference 8 and 9). In this regard, groundwater within the shale formation is not extracted for potable use and rarely extracted for any commercial / industrial purposes.

The rate of groundwater movement is likely to be low because of the low relief, low altitude (approximately 15m AHD) and the low permeability of the underlying Shale (between 10^{-8} and 10^{-6} m/sec – reference 10). Groundwater flow is dominated by water movement through fractures (or joints), where stress has caused partial loss of cohesion in the rock and evidence of potential water bearing fractures is usually the presence of clay or iron-staining along the face of the joints.

5.5.2 Site Specific

Permanent groundwater (i.e. the water table) was not encountered by the testpits and boreholes. Permanent groundwater is expected to be confined at depth within the bedrock formation.

5.6 AREAS AND TYPE OF CONTAMINATION

As detailed in the DSI report (reference 2), there exists an areas of ACM contaminated fill material across the western part of the site which is shown as 'red' shading on **Figure 5**. This ACM contaminated fill material extends across the following allotments (or part thereof):



- ◇ Lot 4 DP1059050,
- ◇ Lots 2 and 3 DP 567165,
- ◇ Lot 7 DP1037645,
- ◇ Lot 4 DP582485, and
- ◇ Lot 1 DP1254549.

Based on our previous field investigations, it is estimated that the ACM contaminated fill covers an area of approximately 5,500m² and has an average depth of approximately 0.9m. This equates to an estimated volume of 5,000m³ or 9,000 tonnes if assuming a density of 1.8t/m³.

There also exists some surface ACM debris (shown as hatched area on **Figure 5**) which extends across the following allotments (or part thereof):

- ◇ Lots 20 and 21 DP575281,
- ◇ Lots 21 and 22 DP605517,
- ◇ Lots 1 and 4 DP582485,
- ◇ Lots 3 and 4 DP 26819, and
- ◇ Lot 5 DP 26819.

Based on our field observations the surface ACM debris extends across an area of approximately 3,000m².

Finally, it is noted that no friable asbestos was identified in soil samples analysed as part of the previous investigations.

5.7 WASTE CLASSIFICATION

A waste classification of the contaminated fill material, and all the fill material encountered across the site, including the stockpiles, has been completed in accordance with the NSW EPA waste guidelines (reference 5) by using the analytical results from the DSI investigation and subsequent Toxicity Characteristic Leaching Procedure (TCLP) testing on selective samples.



5.7.1 Waste Classification Process

Under *the waste guidelines*, non-liquid waste may be classified in the following groups:

- (i) General Solid Waste (Putrescibles),
- (ii) General Solid Waste (Non-putrescibles),
- (iii) Restricted Solid waste,
- (iv) Hazardous Waste, and
- (v) Special Waste (including asbestos waste).

The procedure for determining the type of waste and the classification is a six-step process as outlined in **Table 2** below.

Table 2: Six Step Waste Classification Procedure

Step	Comments	Rationale
1. Is the waste special waste?	YES	Asbestos Containing Material (ACM) was found at sporadic locations within the fill layer which is the subject of this RAP and has been assumed to be within the entire fill layer. ACM was also sporadically found at the surface in other parts of the site. Refer to Figure 5 . No clinical or related waste, or waste tyres were observed during the field assessment conducted as part of this assessment or during the earlier site contamination investigation.
2. Is the waste liquid waste	No	The waste predominately comprises soil.
3. Is the waste pre-classified?	No	The soil is not pre-classified.
4. Does the waste possess hazardous waste characteristics?	No	The waste had no obvious hazardous waste characteristics such as explosives, gases, flammable solids, corrosive substances, coal tar, batteries, lead paint or dangerous goods containers.
5. Determining a wastes classification using chemical assessment.	Conducted	Refer to Section 5.7.2 below
6. Is the waste putrescible or non-putrescible?	Non-putrescible	The waste predominately comprises silty sand soil with some anthropogenic material, all of which is non-putrescible.



5.7.2 Chemical Assessment of the Waste

The chemical waste classification criteria have been adopted from *the NSW EPA waste guidelines* (reference 5).

Part of the procedure includes the comparison of analytical data against contaminant threshold (CT) values specific to a waste category. The CT values are highly conservative and are based on the assumption that all the contaminants present in a sample are leachable and would leach completely.

Alternatively, the analytical data can be compared against specific contaminant concentration (SCC) thresholds when used in conjunction with toxicity characteristic leaching procedure (TCLP) thresholds. The relevant CT thresholds and SCC/TCLP thresholds from the waste guidelines are presented in **Table 3**.

A full copy of the relevant laboratory reports is provided for reference in **Appendix C**, while a summary of the analytical results is provided in **Table 4** for the ACM contaminated fill layer, **Table 5** for the soil stockpiles (SP-A, SP-B, SP-C & SP-D) and **Table 6** for all remaining areas of fill.

In summary, the analytical results for all the fill samples were below the general solid waste CT1 threshold levels or the SCC1/TCLP1 threshold levels.



Table 3: Chemical Waste Classification Criteria ¹

Parameter	Maximum Values of Specific Contaminant concentrations for classification without TCLP		Maximum Values for Leachable (TCLP) Concentration and Specific Contaminant Concentration (SCC)			
	General Solid Waste	Restricted Solid Waste	General Solid Waste		Restricted Solid Waste	
	CT1 mg/kg	CT2 mg/kg	SCC1 mg/kg	TCLP1 mg/L	SCC2 mg/kg	TCLP2 mg/L
Metals						
Arsenic	100	400	500	5	2,000	20
Cadmium	20	80	100	1	400	4
Chromium (VI)	100	400	1,900	5	7,600	20
Lead	100	400	1,500	5	6,000	20
Mercury	4	16	50	0.2	200	0.8
Nickel	40	160	1,050	2	4,200	8
TPH						
TPH C ₆ -C ₉	650	2,600	650	N/A ²	N/A ²	N/A ²
TPH C ₁₀ -C ₃₆	10,000	40,000	10,000	N/A ²	N/A ²	N/A ²
BTEX						
Benzene	10	40	18	0.5	72	2
Toluene	288	1,152	518	14.4	2,073	57.6
Ethylbenzene	600	2,400	1,080	30	4,320	120
Total Xylenes	1,000	4,000	1,800	50	7,200	200
PAHs						
Benzo(a)pyrene	0.8	3.2	10	0.04	23	0.16
Total PAHs	200	800	200	N/A ²	800	N/A ²
Other Chemicals						
Scheduled Chemicals ³	<50	<50	<50	N/A ²	<50	N/A ²
Moderately Harmful Pesticides ³	250	1000	250	N/A ²	1,000	N/A ²

Notes

Note 1: NSW EPA (2014) Waste Classification Guidelines (Part 1 - Tables 1, 2 and 3)

Note 2: TPH, Total PAHs, scheduled chemicals (SCC) and Moderately Harmful Pesticides (MHP) are evaluated on the basis of total contaminant concentrations (CT or SCC) only. No TCLP required

Note 3: The sum of the SCC and MHP must not exceed the criteria

TABLE 4 - Waste Classification Chemical Results (ACM CONTAMINATED FILL MATERIAL)

Sample ID		ZZ190623- 01 ZZ190623- 03 ZZ190623- 05 ZZ190623- A1 ZZ190623- 07 ZZ190623- 08 ZZ190623- 100 ZZ190623- 10 ZZ190623- 12 ZZ190623- 13 ZZ190623- 14 ZZ190623- 16 ZZ190623- 19 ZZ190623- A2 ZZ190623- 101 ZZ190623- 22 ZZ190623- A3 ZZ190623- 25 ZZ190623- 28 ZZ190623- 40 ZZ190623- A4 ZZ190623- 41 ZZ190623- 47 ZZ220623- 56																								Maximum Result	Waste Classification Criteria	General Solid Waste (With TCLP Data)		
Analyte	Location	TP1	TP2	TP3	TP3	TP4	TP4	Blind	TP5	TP5	TP6	TP6	TP7	TP8	TP8	Split	TP9	TP9	TP10	TP11	TP16	TP16	TP16	TP18	BH21		General Solid Waste (Without TCLP)			
	Depth	0.05 - 0.15	0.05 - 0.15	0.05 - 0.15	0.3 - 0.4	0.05 - 0.15	0.5 - 0.6	Replicate of	0.05 - 0.15	0.15 - 0.25	0.05 - 0.15	0.7 - 0.8	0.05 - 0.2	0.05 - 0.15	0.4 - 0.5	Duplicate of	0.05 - 0.15	0.3 - 0.4	0.05 - 0.15	0.05 - 0.15	0.05 - 0.5	0.3 - 0.4	0.7 - 0.8	0.05 - 0.2	0.1 - 0.2					
Type	FILL-Silty SAND	FILL-Silty SAND	FILL-Silty SAND	Fibro	FILL-Silty SAND	FILL-Silty SAND	ZZ190623- 08	FILL-Silty SAND	Fill-Gravelly SAND	FILL-Silty CLAY	FILL-Silty SAND	FILL-Silty SAND	FILL-Silty SAND	Fibro	ZZ190623- 21	Fill-Silty SAND	Fibro	Fill-Silty SAND	Fill-Silty SAND	Fill-Silty SAND	Fibro	Fill-Silty SAND	Fill-Silty SAND	Fill-Gravelly CLAY	CT1 (mg/kg)		SCC1 (mg/kg)	TCLP1 (mg/L)		
Asbestos																														
Asbestos Detected	Yes/No	No	No	No	YES	-	No	-	No	-	No	-	No	No	YES	-	No	YES	No	No	No	YES	-	No	YES	-	-	-	-	
Respirable Fibres	Yes/No	No	No	No	No	-	No	-	No	-	No	-	No	No	-	No	-	No	No	No	No	-	No	No	No	-	-	-	-	
Metals																														
Arsenic (Total)	mg/kg	11	11	10	-	8	8	6	<4	7	9	12	8	9	-	11	9	-	9	12	5	-	9	7	8	12	100	-	-	
Cadmium (Total)	mg/kg	<0.4	<0.4	<0.4	-	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	-	<0.4	<0.4	-	<0.4	<0.4	<0.4	-	<0.4	<0.4	<0.4	<0.4	20	-	-	
Chromium ¹ (Total)	mg/kg	22	24	24	-	25	21	15	5	24	21	15	18	20	-	36	19	-	21	25	13	-	21	16	18	36	100	-	-	
Copper (Total)	mg/kg	6	11	3	-	9	9	16	57	23	8	16	36	19	-	13	16	-	8	17	13	-	18	33	40	57	-	-	-	
Lead (Total)	mg/kg	29	36	20	-	150	21	26	2	20	17	39	50	67	-	12	31	-	19	32	19	-	28	89	39	150	100	1,500	-	
Lead (TCLP)	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	5	-	
Mercury (Total)	mg/kg	0.2	0.1	<0.1	-	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.7	0.7	-	<0.1	<0.1	-	<0.1	0.2	<0.1	-	0.1	0.3	0.1	0.7	4	-	-	
Nickel (Total)	mg/kg	2	5	2	-	7	4	7	91	44	3	22	5	11	-	4	5	-	3	6	7	-	11	14	19	91	40	1,050	-	
Nickel (TCLP)	mg/L	-	-	-	-	-	-	-	0.1	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	2	-	
Zinc (Total)	mg/kg	50	97	18	-	100	18	45	32	65	13	98	63	100	-	8	48	-	16	64	26	-	56	160	59	160	-	-	-	
BTEXN																														
Benzene	mg/kg	<0.2	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	10	-	-	
Toluene	mg/kg	<0.5	<0.5	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	-	<0.5	<0.5	<0.5	288	-	-	
Ethylbenzene	mg/kg	<1	<1	<1	-	-	<1	<1	<1	<1	<1	-	<1	<1	-	<1	<1	-	<1	<1	<1	-	-	<1	<1	<1	600	-	-	
Total Xylenes	mg/kg	<1	<1	<1	-	-	<1	<1	<1	<1	<1	-	<1	<1	-	<1	<1	-	<1	<1	<1	-	-	<1	<1	<1	1,000	-	-	
Naphthalene	mg/kg	<1	<1	<1	-	-	<1	<1	<1	<1	<1	-	<1	<1	-	<1	<1	-	<1	<1	<1	-	-	<1	<1	<1	-	-	-	
TRH																														
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	-	-	<25	<25	<25	<25	<25	-	<25	<25	-	<25	<25	-	<25	<25	<25	-	-	<25	<25	<25	650	-	-	
TRH >C ₁₀ -C ₄₀	mg/kg	<100	<100	<100	-	-	<100	<100	<100	<100	<100	-	<100	<100	-	<100	<100	-	<100	<100	<100	-	-	<100	<100	<100	340	10,000	-	-
PAHs																														
Benzo(a)pyrene (Total)	mg/kg	<0.05	<0.05	<0.05	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	<0.05	-	-	<0.05	<0.05	0	0.8	-	-	
Total PAHs	mg/kg	<0.05	<0.05	<0.05	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	<0.05	-	-	<0.05	<0.05	0	200	-	-	
PCBs																														
Total PCBs	mg/kg	<0.1	-	<0.1	-	-	-	-	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	-	-	-	-	-	-	<0.1	50	-	-	
Scheduled Chemicals ²																														
Heptachlor	mg/kg	<0.1	-	<0.1	-	-	-	-	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	-	-	-	-	-	-	<0.1	<50 ²	<50 ²	-	
Aldrin	mg/kg	<0.1	-	<0.1	-	-	-	-	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	-	-	-	-	-	-	<0.1			-	
Dieldrin	mg/kg	<0.1	-	<0.1	-	-	-	-	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	-	-	-	-	-	-	<0.1			-	
Endrin	mg/kg	<0.1	-	<0.1	-	-	-	-	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	-	-	-	-	-	-	<0.1			-	
Chlordane - Total	mg/kg	<0.1	-	<0.1	-	-	-	-	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	-	-	-	-	-	-	<0.1			-	
DDD+DDE+DDT	mg/kg	<0.1	-	<0.1	-	-	-	-	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	-	-	-	-	-	-	<0.1			-	
Hexachlorobenzene	mg/kg	<0.1	-	<0.1	-	-	-	-	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	-	-	-	-	-	-	<0.1			-	
Endrin Aldehyde	mg/kg	<0.1	-	<0.1	-	-	-	-	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	-	-	-	-	-	-	<0.1			-	
a-BHC	mg/kg	<0.1	-	<0.1	-	-	-	-	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	-	-	-	-	-	-	<0.1			-	
b-BHC	mg/kg	<0.1	-	<0.1	-	-	-	-	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	-	-	-	-	-	-	<0.1			-	
d-BHC	mg/kg	<0.1	-	<0.1	-	-	-	-	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	-	-	-	-	-	-	<0.1			-	
g-BHC	mg/kg	<0.1	-	<0.1	-	-	-	-	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	-	-	-	-	-	-	<0.1			-	
Heptachlor Epoxide	mg/kg	<0.1	-	<0.1	-	-	-	-	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	-	-	-	-	-	-	<0.1			-	

TABLE NOTES:

BOLD

1– Total Chromium analytical result includes chromium (III) and (VI).

TABLE 5 - Waste Classification Chemical Results (Stockpiles SP-A, SP-B, SP-C and SP-D)

Sample ID		ZZ190623-A1	ZZ190623-A2	ZZ190623-A3	ZZ190623-B1	ZZ190623-B2	ZZ190623-B3	ZZ190623-C1	ZZ190623-C2	ZZ190623-C3	ZZ190623-C4	ZZ190623-C5	ZZ190623-C6	ZZ190623-D1	ZZ190623-D2	ZZ190623-D3	ZZ190623-D4	Maximum Result	Waste Classification Criteria	
Analyte	Location	Stockpile A	Stockpile A	Stockpile A	Stockpile B	Stockpile B	Stockpile B	Stockpile C	Stockpile C	Stockpile C	Stockpile C	Stockpile C	Stockpile C	Stockpile D	Stockpile D	Stockpile D	Stockpile D		General Solid Waste (Without TCLP)	
	Depth	0.0 - 0.2	0.0 - 0.2	0.0 - 0.2	0.0 - 0.2	0.0 - 0.2	0.0 - 0.2	0.0 - 0.2	0.0 - 0.2	0.0 - 0.2	0.0 - 0.2	0.0 - 0.2	0.0 - 0.2	0.0 - 0.2	0.0 - 0.2	0.0 - 0.2	0.0 - 0.2			CT1 (mg/kg)
	Type	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL			
Asbestos																				
Asbestos Detected	Yes/No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Nil Detection	-
Respirable Fibres	Yes/No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Nil Detection	-
Metals																				
Arsenic (Total)	mg/kg	<4	<4	<4	5	5	4	7	5	5	5	5	5	8	7	<4	10	10	100	
Cadmium (Total)	mg/kg	<0.4	<0.4	0.7	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	20	
Chromium ¹ (Total)	mg/kg	10	13	4	13	16	14	16	13	13	12	14	15	20	21	7	9	21	100	
Copper (Total)	mg/kg	18	21	10	25	27	29	33	21	54	20	290	37	30	28	7	12	290	-	
Lead (Total)	mg/kg	16	17	7	27	47	62	45	38	40	36	54	47	49	74	11	16	74	100	
Mercury (Total)	mg/kg	0.3	0.4	0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	<0.1	0.4	4	
Nickel (Total)	mg/kg	8	7	4	8	8	8	7	8	6	7	8	7	8	7	5	6	8	40	
Zinc (Total)	mg/kg	62	71	65	84	78	110	88	69	93	72	86	87	100	100	26	28	110	-	
BTEXN																				
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Total Xylenes	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Naphthalene	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
TRH																				
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25	<50	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	
TRH >C ₁₀ -C ₄₀	mg/kg	220	<50	<200	340	330	210	120	110	150	<50	120	<50	140	140	<50	<50	340	10,000	
PAHs																				
Benzo(a)pyrene (Total)	mg/kg	<0.05	<0.05	<0.2	0.07	<0.05	<0.05	0.4	0.3	0.3	0.2	0.5	0.2	0.3	0.3	<0.05	<0.05	0.5	0.8	
Total PAHs	mg/kg	<0.05	<0.05	<0.2	0.07	<0.05	<0.05	3.9	2.6	2.6	2.2	4.6	1.5	2.9	2.5	<0.05	<0.05	4.6	200	
PCBs																				
Total PCBs	mg/kg	<0.1	<0.1	<0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	50	
Scheduled Chemicals ²																				
Heptachlor	mg/kg	<0.1	<0.1	<0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<50 ²	
Aldrin	mg/kg	<0.1	<0.1	<0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Dieldrin	mg/kg	<0.1	<0.1	<0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Endrin	mg/kg	<0.1	<0.1	<0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Chlordane - Total	mg/kg	<0.1	<0.1	<0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
DDD+DDE+DDT	mg/kg	<0.1	<0.1	<0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Hexachlorobenzene	mg/kg	<0.1	<0.1	<0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
a-BHC	mg/kg	<0.1	<0.1	<0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
b-BHC	mg/kg	<0.1	<0.1	<0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
d-BHC	mg/kg	<0.1	<0.1	<0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
g-BHC	mg/kg	<0.1	<0.1	<0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		

TABLE NOTES:

BOLD

1 – Total Chromium analytical result includes chromium (III) and (VI).

2 - Scheduled chemical include some organochlorine pesticides, phenolics and SVOCs. The sum of the SCC for all scheduled chemicals must not exceed the criteria. Some scheduled chemicals were not analysed but they were not chemicals of concern for the site.

TABLE 6 - Waste Classification Chemical Results (NON ACM CONTAMINATED FILL MATERIAL)

Sample ID		ZZ190623-31	ZZ190623-102	ZZ190623-33	ZZ190623-35	ZZ190623-103	ZZ190623-37	ZZ190623-38	ZZ190623-43	ZZ190623-44	ZZ190623-45	ZZ190623-50	ZZ190623-53	ZZ190623-104	Maximum Result	Waste Classification Criteria			
Analyte	Location	TP12	Blind	TP13	TP14	Split	TP15	TP15	TP17	TP17	TP17	TP19	TP20	Blind		General Solid Waste (Without TCLP)	General Solid Waste (With TCLP Data)		
	Depth	0.1 - 0.2	Replicate of	0.05 - 0.2	0.05 - 0.2	Duplicate of	0.05 - 0.2	0.6 - 0.7	0.05 - 0.2	0.6 - 0.7	1.2 - 1.3	0.05 - 0.2	0.05 - 0.2	Replicate of			CT1 (mg/kg)	SCC1 (mg/kg)	TCLP1 (mg/L)
	Type	Fill-Silty SAND	ZZ190623-32	Fill-Silty SAND	Fill-Silty SAND	ZZ190623-35	Fill-Silty SAND	Fill-Silty SAND	Fill-Silty SAND	Fill-Silty SAND	Fill-Silty SAND	Fill-Silty SAND	Fill-Silty SAND	ZZ190623-54					
Asbestos																			
Asbestos Detected	Yes/No	No	-	-	-	-	No	-	No	-	-	No	No	-	-	-	-	-	
Respirable Fibres	Yes/No	No	-	-	-	-	No	-	No	-	-	No	No	-	-	-	-	-	
Metals																			
Arsenic (Total)	mg/kg	9	7	9	8	9	9	14	10	7	12	5	<4	4	14	100	-	-	
Cadmium (Total)	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	20	-	-	
Chromium ¹ (Total)	mg/kg	23	16	21	32	22	21	17	15	17	18	8	23	9	32	100	-	-	
Copper (Total)	mg/kg	9	3	23	13	15	11	17	14	16	16	10	27	13	27	-	-	-	
Lead (Total)	mg/kg	47	8	24	38	44	28	16	36	31	24	27	280	12	280	100	1,500	-	
Lead (TCLP)	mg/L	-	-	-	-	-	-	-	-	-	-	-	0.2	-	0.2	-	-	5	
Mercury (Total)	mg/kg	<0.1	<0.1	0.1	0.7	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.7	4	-	-	
Nickel (Total)	mg/kg	4	1	12	10	5	5	3	5	7	4	4	39	4	39	40	1,050	-	
Nickel (TCLP)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	2	
Zinc (Total)	mg/kg	66	6	78	64	84	50	14	64	56	46	49	88	31	88	-	-	-	
BTEXN																			
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	<0.2	10	-	-	
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	288	-	-	
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	-	-	<1	<1	<1	<1	600	-	-	
Total Xylenes	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	-	-	<1	<1	<1	<1	1,000	-	-	
Naphthalene	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	-	-	<1	<1	<1	<1	-	-	-	
TRH																			
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25	<25	<25	<25	-	-	<25	<25	<25	<25	650	-	-	
TRH >C ₁₀ -C ₄₀	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	-	-	<100	<100	<100	340	10,000	-	-	
PAHs																			
Benzo(a)pyrene (Total)	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.09	<0.05	0.09	0.8	-	-	
Total PAHs	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.52	<0.05	0.52	200	-	-	
PCBs																			
Total PCBs	mg/kg	<0.1	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	-	-	<0.1	<0.1	<0.1	<0.1	50	-	-	
Scheduled Chemicals ²																			
Heptachlor	mg/kg	<0.1	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	-	-	<0.1	<0.1	<0.1	<0.1	<50 ²	<50 ²	-	
Aldrin	mg/kg	<0.1	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	-	-	<0.1	<0.1	<0.1	<0.1			-	
Dieldrin	mg/kg	<0.1	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	-	-	<0.1	<0.1	<0.1	<0.1			-	
Endrin	mg/kg	<0.1	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	-	-	<0.1	<0.1	<0.1	<0.1			-	
Chlordane - Total	mg/kg	<0.1	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	-	-	<0.1	<0.1	<0.1	<0.1			-	
DDD+DDE+DDT	mg/kg	<0.1	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	-	-	<0.1	<0.1	<0.1	<0.1			-	
Hexachlorobenzene	mg/kg	<0.1	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	-	-	<0.1	<0.1	<0.1	<0.1			-	
Endrin Aldehyde	mg/kg	<0.1	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	-	-	<0.1	<0.1	<0.1	<0.1			-	
a-BHC	mg/kg	<0.1	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	-	-	<0.1	<0.1	<0.1	<0.1			-	
b-BHC	mg/kg	<0.1	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	-	-	<0.1	<0.1	<0.1	<0.1			-	
d-BHC	mg/kg	<0.1	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	-	-	<0.1	<0.1	<0.1	<0.1			-	
g-BHC	mg/kg	<0.1	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	-	-	<0.1	<0.1	<0.1	<0.1			-	
Heptachlor Epoxide	mg/kg	<0.1	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	-	-	<0.1	<0.1	<0.1	<0.1			-	

TABLE NOTES:

BOLD

1 – Total Chromium analytical result includes chromium (III) and (VI).

2 - Scheduled chemical include some organochlorine pesticides, phenolics and SVOCs. The sum of the SCC for all scheduled chemicals must not exceed the criteria. Some scheduled chemicals were not analysed but they were not chemicals of concern for the site.

TABLE 6 - Waste Classification Chemical Results (NON ACM CONTAMINATED FILL MATERIAL)

Sample ID		ZZ190623-55	ZZ190623-57	ZZ190623-59	ZZ190623-61	ZZ190623-63	ZZ190623-65	ZZ190623-67	ZZ190623-69	ZZ220623-01	ZZ220623-04	ZZ220623-07	ZZ220623-08	ZZ220623-10	ZZ220623-201	ZZ220623-11	ZZ220623-13	ZZ220623-16	ZZ220623-202	Maximum Result	Waste Classification Criteria		
Analyte	Location	TP21	TP22	TP23	TP24	TP25	TP26	TP28	TP27	BH1	BH2	BH3	BH3	BH4	Split	BH4	BH5	BH6	Blind		General Solid Waste (Without TCLP)	General Solid Waste (With TCLP Data)	
	Depth	0.05 - 0.2	0.1 - 0.2	0.05 - 0.15	0.05 - 0.15	0.05 - 0.15	0.05 - 0.2	0.05 - 0.2	0.05 - 0.2	0.1 - 0.2	0.1 - 0.2	0.1 - 0.2	0.6 - 0.7	0.1 - 0.2	Duplicate of	0.4 - 0.5	0.1 - 0.2	0.05 - 0.3	Replicate of				
		Type	Fill-Silty SAND	Fill-Silty SAND	Fill-Silty SAND	Fill-Silty SAND	Fill-Silty SAND	T/S - Silty CLAY	Fill-Silty SAND	Fill-Silty SAND	Fill-Sandy CLAY	Fill-Gravelly SAND	Fill-Silty CLAY	Gravelly SAND	ZZ220623-10	Fill-Silty SAND	Fill-Sandy GRAVEL	Fill-Gravelly SAND	ZZ220623-16		CT1 (mg/kg)	SCC1 (mg/kg)	TCLP1 (mg/L)
Asbestos																							
Asbestos Detected	Yes/No	No	No	No	No	No	No	-	-	No	-	-	-	No	-	-	No	No	-	-	-	-	-
Respirable Fibres	Yes/No	No	No	No	No	No	No	-	-	No	-	-	-	No	-	-	No	No	-	-	-	-	-
Metals																							
Arsenic (Total)	mg/kg	5	4	7	6	8	6	8	5	9	4	<4	5	<4	<4	7	<4	<4	<4	9	100	-	-
Cadmium (Total)	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	20	-	-
Chromium ¹ (Total)	mg/kg	13	70	22	17	17	16	18	11	21	32	9	16	13	12	23	17	12	11	70	100	-	-
Copper (Total)	mg/kg	40	44	13	32	42	12	19	16	47	41	40	40	15	16	20	16	13	19	47	-	-	-
Lead (Total)	mg/kg	61	58	32	88	30	19	29	39	93	40	21	380	14	12	64	18	10	13	380	100	1,500	-
Lead (TCLP)	mg/L	-	-	-	-	-	-	-	-	-	-	-	0.9	-	-	-	-	-	-	0.9	-	-	5
Mercury (Total)	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	4	-	-
Nickel (Total)	mg/kg	7	52	5	9	6	9	14	8	6	23	12	12	8	7	11	6	5	5	52	40	1,050	-
Nickel (TCLP)	mg/L	-	<0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	2
Zinc (Total)	mg/kg	120	87	52	160	79	30	40	71	140	86	35	150	47	32	220	22	35	26	220	-	-	-
BTEXN																							
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	10	-	-
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	288	-	-
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	<1	<1	<1	<1	<1	600	-	-
Total Xylenes	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	<1	<1	<1	<1	<1	1,000	-	-
Naphthalene	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	<1	<1	<1	<1	<1	-	-	-
TRH																							
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	-	<25	<25	<25	<25	<25	<25	<25	650	-	-
TRH >C ₁₀ -C ₄₀	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	<100	510	<100	-	<100	300	<100	370	220	420	340	10,000	-	-
PAHs																							
Benzo(a)pyrene (Total)	mg/kg	0.1	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	-	0.1	0.1	0.36	0.07	0.2	0.2	0.2	0.36	0.8	-	-
Total PAHs	mg/kg	0.71	0.85	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.3	-	0.2	1.9	3.7	0.2	2.2	1.8	2.7	3.7	200	-	-
PCBs																							
Total PCBs	mg/kg	-	-	<0.1	<0.1	-	<0.1	-	-	<0.1	-	-	-	<0.1	<0.1	-	-	<0.1	<0.1	<0.1	50	-	-
Scheduled Chemicals ²																							
Heptachlor	mg/kg	-	-	<0.1	<0.1	-	<0.1	-	-	<0.1	-	-	-	<0.1	<0.1	-	-	<0.1	<0.1	<0.1	<50 ²	<50 ²	-
Aldrin	mg/kg	-	-	<0.1	<0.1	-	<0.1	-	-	<0.1	-	-	-	<0.1	<0.1	-	-	<0.1	<0.1	<0.1			-
Dieldrin	mg/kg	-	-	<0.1	<0.1	-	<0.1	-	-	<0.1	-	-	-	<0.1	<0.1	-	-	<0.1	<0.1	<0.1			-
Endrin	mg/kg	-	-	<0.1	<0.1	-	<0.1	-	-	<0.1	-	-	-	<0.1	<0.1	-	-	<0.1	<0.1	<0.1			-
Chlordane - Total	mg/kg	-	-	<0.1	<0.1	-	<0.1	-	-	<0.1	-	-	-	<0.1	<0.1	-	-	<0.1	<0.1	<0.1			-
DDD+DDE+DDT	mg/kg	-	-	<0.1	<0.1	-	<0.1	-	-	<0.1	-	-	-	<0.1	<0.1	-	-	<0.1	<0.1	<0.1			-
Hexachlorobenzene	mg/kg	-	-	<0.1	<0.1	-	<0.1	-	-	<0.1	-	-	-	<0.1	<0.1	-	-	<0.1	<0.1	<0.1			-
Endrin Aldehyde	mg/kg	-	-	<0.1	<0.1	-	<0.1	-	-	<0.1	-	-	-	<0.1	<0.1	-	-	<0.1	<0.1	<0.1			-
a-BHC	mg/kg	-	-	<0.1	<0.1	-	<0.1	-	-	<0.1	-	-	-	<0.1	<0.1	-	-	<0.1	<0.1	<0.1			-
b-BHC	mg/kg	-	-	<0.1	<0.1	-	<0.1	-	-	<0.1	-	-	-	<0.1	<0.1	-	-	<0.1	<0.1	<0.1			-
d-BHC	mg/kg	-	-	<0.1	<0.1	-	<0.1	-	-	<0.1	-	-	-	<0.1	<0.1	-	-	<0.1	<0.1	<0.1			-
g-BHC	mg/kg	-	-	<0.1	<0.1	-	<0.1	-	-	<0.1	-	-	-	<0.1	<0.1	-	-	<0.1	<0.1	<0.1			-
Heptachlor Epoxide	mg/kg	-	-	<0.1	<0.1	-	<0.1	-	-	<0.1	-	-	-	<0.1	<0.1	-	-	<0.1	<0.1	<0.1			-

TABLE NOTES:

BOLD

1 – Total Chromium analytical result includes chromium (III) and (VI).

2 - Scheduled chemical include some organochlorine pesticides, phenolics and SVOCs. The sum of the SCC for all scheduled chemicals must not exceed the criteria. Some scheduled chemicals were not analysed but they were not chemicals of concern for the site.

TABLE 6 - Waste Classification Chemical Results (NON ACM CONTAMINATED FILL MATERIAL)

Sample ID		ZZ220623-18	ZZ220623-19	ZZ220623-22	ZZ220623-204	ZZ220623-25	ZZ220623-27	ZZ220623-28	ZZ220623-30	ZZ220623-31	ZZ220623-33	ZZ220623-35	ZZ220623-36	ZZ220623-38	ZZ220623-40	ZZ220623-41	ZZ220623-43	ZZ220623-44	ZZ220623-46	Maximum Result	Waste Classification Criteria			
Analyte	Location	BH7	BH7	BH8	Blind	BH9	BH10	BH10	BH11	BH12	BH13	BH13	BH14	BH15	BH15	BH16	BH16	BH18	General Solid Waste (Without TCLP)		General Solid Waste (With TCLP Data)			
	Depth	0.1 - 0.2	0.5 - 0.6	0.05 - 0.2	Replicate of	0.1 - 0.2	0.1 - 0.2	0.6 - 0.7	0.1 - 0.2	0.5 - 0.6	0.1 - 0.2	0.2 - 0.3	0.6 - 0.7	0.1 - 0.2	0.1 - 0.2	0.5 - 0.6	0.2 - 0.3	0.5 - 0.6			0.1 - 0.2	CT1 (mg/kg)	SCC1 (mg/kg)	TCLP1 (mg/L)
	Type	Fill-Gravelly SAND	Fill-Silty CLAY	Fill-Gravelly SAND	ZZ220623-22	Fill-Gravelly SAND	Fill-Gravelly SAND	Fill-Silty CLAY	Fill-Gravelly SAND	Fill - Silty CLAY	Fill-Gravelly SAND	Fill - SAND	Fill - SAND	Fill-Silty CLAY	Fill-Gravelly SAND	Fill-Gravelly SAND	Fill-Gravelly CLAY	Fill-Gravelly CLAY			Fill-Gravelly SAND		SCC1 (mg/kg)	TCLP1 (mg/L)
Asbestos																					-	-	-	-
Asbestos Detected	Yes/No	-	-	No	-	-	No	No	No	-	No	-	-	No	-	-	No	-	No	-	-	-	-	
Respirable Fibres	Yes/No	-	-	No	-	-	No	No	No	-	No	-	-	No	-	-	No	-	No	-	-	-	-	
Metals																					13	100	-	-
Arsenic (Total)	mg/kg	<4	6	<4	<4	<4	<4	13	<4	6	7	<4	<4	5	<4	5	5	6	<4	<0.4	20	-	-	
Cadmium (Total)	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	10	-	-	
Chromium ¹ (Total)	mg/kg	12	19	9	17	23	7	25	9	19	16	5	5	15	25	37	20	21	18	37	200	-	-	
Copper (Total)	mg/kg	28	36	12	28	23	11	12	10	17	24	5	3	17	27	21	35	29	27	36	-	-	-	
Lead (Total)	mg/kg	12	19	8	14	9	8	19	9	18	19	5	3	9	12	7	11	13	9	19	100	1,500	-	
Lead (TCLP)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	5	
Mercury (Total)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.3	<0.1	0.1	<0.1	0.3	<0.1	<0.1	0.4	0.4	4	-	-	
Nickel (Total)	mg/kg	9	9	5	8	9	4	5	4	7	7	4	4	12	22	27	42	27	21	42	40	1,050	-	
Nickel (TCLP)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	2	
Zinc (Total)	mg/kg	27	38	20	38	31	24	16	17	30	38	17	12	16	26	36	23	26	27	38	-	-	-	
BTEXN																					<0.2	10	-	-
Benzene	mg/kg	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	-	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	288	-	-
Toluene	mg/kg	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	600	-	-
Ethylbenzene	mg/kg	<1	-	<1	<1	<1	<1	<1	<1	-	<1	-	<1	<1	<1	-	<1	<1	<1	<1	<1	1,000	-	-
Total Xylenes	mg/kg	<1	-	<1	<1	<1	<1	<1	<1	-	<1	-	<1	<1	<1	-	<1	<1	<1	<1	<1	1,000	-	-
Naphthalene	mg/kg	<1	-	<1	<1	<1	<1	<1	<1	-	<1	-	<1	<1	<1	-	<1	<1	<1	<1	<1	-	-	-
TRH																					<25	650	-	-
TRH C ₉ - C ₉	mg/kg	<25	-	<25	<25	<25	<25	<25	<25	-	<25	-	<25	<25	<25	-	<25	<25	<25	<25	340	10,000	-	-
TRH >C ₁₀ -C ₄₀	mg/kg	580	-	400	330	250	310	<100	240	-	220	-	<100	<100	320	-	<100	<100	210	340	-	-	-	-
PAHs																					0.53	0.8	-	-
Benzo(a)pyrene (Total)	mg/kg	-	-	0.5	0.2	0.1	0.53	0.07	0.2	0.2	0.4	<0.05	<0.05	<0.05	-	-	<0.05	0.06	0.1	0.53	200	-	-	
Total PAHs	mg/kg	-	-	5.3	3	1.2	7.4	0.51	1.8	1.8	4.3	<0.05	<0.05	<0.05	-	-	<0.05	0.3	1.1	7.4	-	-	-	
PCBs																					<0.1	50	-	-
Total PCBs	mg/kg	-	-	-	-	<0.1	-	-	<0.1	-	-	-	-	<0.1	-	-	<0.1	-	-	<0.1	-	-	-	
Scheduled Chemicals ²																					<0.1	<50 ²	<50 ²	-
Heptachlor	mg/kg	-	-	-	-	<0.1	-	-	<0.1	-	-	-	-	<0.1	-	-	<0.1	-	-	<0.1	-	-	-	
Aldrin	mg/kg	-	-	-	-	<0.1	-	-	<0.1	-	-	-	-	<0.1	-	-	<0.1	-	-	<0.1	-	-	-	
Dieldrin	mg/kg	-	-	-	-	<0.1	-	-	<0.1	-	-	-	-	<0.1	-	-	<0.1	-	-	<0.1	-	-	-	
Endrin	mg/kg	-	-	-	-	<0.1	-	-	<0.1	-	-	-	-	<0.1	-	-	<0.1	-	-	<0.1	-	-	-	
Chlordane - Total	mg/kg	-	-	-	-	<0.1	-	-	<0.1	-	-	-	-	<0.1	-	-	<0.1	-	-	<0.1	-	-	-	
DDD+DDE+DDT	mg/kg	-	-	-	-	<0.1	-	-	<0.1	-	-	-	-	<0.1	-	-	<0.1	-	-	<0.1	-	-	-	
Hexachlorobenzene	mg/kg	-	-	-	-	<0.1	-	-	<0.1	-	-	-	-	<0.1	-	-	<0.1	-	-	<0.1	-	-	-	
Endrin Aldehyde	mg/kg	-	-	-	-	<0.1	-	-	<0.1	-	-	-	-	<0.1	-	-	<0.1	-	-	<0.1	-	-	-	
a-BHC	mg/kg	-	-	-	-	<0.1	-	-	<0.1	-	-	-	-	<0.1	-	-	<0.1	-	-	<0.1	-	-	-	
b-BHC	mg/kg	-	-	-	-	<0.1	-	-	<0.1	-	-	-	-	<0.1	-	-	<0.1	-	-	<0.1	-	-	-	
d-BHC	mg/kg	-	-	-	-	<0.1	-	-	<0.1	-	-	-	-	<0.1	-	-	<0.1	-	-	<0.1	-	-	-	
g-BHC	mg/kg	-	-	-	-	<0.1	-	-	<0.1	-	-	-	-	<0.1	-	-	<0.1	-	-	<0.1	-	-	-	
Heptachlor Epoxide	mg/kg	-	-	-	-	<0.1	-	-	<0.1	-	-	-	-	<0.1	-	-	<0.1	-	-	<0.1	-	-	-	

TABLE NOTES:

BOLD

1 - Total Chromium analytical result includes chromium (III) and (VI).

2 - Scheduled chemical include some organochlorine pesticides, phenolics and SVOCs. The sum of the SCC for all scheduled chemicals must not exceed the criteria. Some scheduled chemicals were not analysed but they were not chemicals of concern for the site.

TABLE 6 - Waste Classification Chemical Results (NON ACM CONTAMINATED FILL MATERIAL)

Sample ID		ZZ220623-49	ZZ220623-207	ZZ220623-50	ZZ220623-51	ZZ220623-53	ZZ220623-54	ZZ220623-208	ZZ220623-58	ZZ220623-209	ZZ220623-60	ZZ220623-62	ZZ220623-64	ZZ220623-210	ZZ220623-67	ZZ220623-68	ZZ220623-70	ZZ220623-72	Maximum Result	Waste Classification Criteria	General Solid Waste (With TCLP Data)	
Analyte	Location	BP17	Split	BH19	BH19	BH20	BH20	Blind	BH22	Split	BH28	BH23	BH24	Blind	BH25	BH26	BH27	BH29		General Solid Waste (Without TCLP)		
	Depth	0.1 - 0.3	Duplicate of	0.1 - 0.2	0.5 - 0.6	0.1 - 0.2	0.5 - 0.7	Replicate of	0.1 - 0.2	Duplicate of	0.1 - 0.2	0.1 - 0.2	0.1 - 0.2	Replicate of	0.1 - 0.2	0.1 - 0.2	0.1 - 0.2	0.1 - 0.2				
	Type	Fill - Sandy GRAVEL	ZZ220623-49	Fill-Gravelly SAND	Fill-Silty CLAY	Fill-Gravelly SAND	Fill-Silty CLAY	ZZ220623-54	Fill-Gravelly CLAY	ZZ220623-59	Fill-Gravelly SAND	Fill-Gravelly SAND	Fill-Gravelly CLAY	ZZ220623-65	Fill-Gravelly CLAY	Fill - Gravelly CLAY	Fill - Clayey GRAVEL	Fill-Silty CLAY		CT1 (mg/kg)	SCC1 (mg/kg)	TCLP1 (mg/L)
Asbestos																						
Asbestos Detected	Yes/No	No	-	No	-	No	-	-	No		No	No	No	-	No	No	No	-	-	-	-	-
Respirable Fibres	Yes/No	No	-	No	-	No	-	-	No		No	No	No	-	No	No	No	-	-	-	-	-
Metals																						
Arsenic (Total)	mg/kg	<4	<4	5	6	<4	20	19	86	7	<4	8	12	10	6	9	9	<4	86	100	-	-
Cadmium (Total)	mg/kg	<0.4	<0.04	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	20	-	-
Chromium ¹ (Total)	mg/kg	23	23	10	14	10	20	18	21	25	52	17	21	21	15	20	19	26	52	100	-	-
Copper (Total)	mg/kg	42	31	10	10	46	24	19	33	15	110	26	20	12	21	31	24	56	110	-	-	-
Lead (Total)	mg/kg	9	4	17	10	6	38	19	95	5	24	13	26	12	19	37	37	8	95	100	1,500	-
Lead (TCLP)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	5
Mercury (Total)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	0.2	4	-	-
Nickel (Total)	mg/kg	28	28	9	3	59	17	15	24	4	36	24	11	4	17	16	22	35	59	40	1,050	-
Nickel (TCLP)	mg/L	-	-	-	-	0.2	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	2
Zinc (Total)	mg/kg	31	36	53	4	25	150	38	83	26	49	37	24	14	18	43	56	34	150	-	-	-
BTEXN																						
Benzene	mg/kg	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	10	-	-
Toluene	mg/kg	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	288	-	-
Ethylbenzene	mg/kg	<1	<1	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	600	-	-
Total Xylenes	mg/kg	<1	<1	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1,000	-	-
Naphthalene	mg/kg	<1	<1	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	-
TRH																						
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	-	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	650	-	-
TRH >C ₁₀ -C ₄₀	mg/kg	660	390	<100	-	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	340	10,000	-	-
PAHs																						
Benzo(a)pyrene (Total)	mg/kg	0.2	0.27	0.05	-	<0.05	0.09	<0.05	<0.05	<0.05	0.1	<0.05	0.1	<0.05	<0.05	<0.05	<0.05	-	0.27	0.8	-	-
Total PAHs	mg/kg	1.9	2	0.05	-	<0.05	0.09	<0.05	<0.05	<0.05	1.2	<0.05	1.3	<0.05	<0.05	<0.05	<0.05	-	2	200	-	-
PCBs																						
Total PCBs	mg/kg	<0.1	-	-	-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	-	<0.1	-	<0.1	50	-	-
Scheduled Chemicals ²																						
Heptachlor	mg/kg	<0.1	-	-	-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	-	<0.1	-	<0.1	<50 ²	<50 ²	-
Aldrin	mg/kg	<0.1	-	-	-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	-	<0.1	-	<0.1			-
Dieldrin	mg/kg	<0.1	-	-	-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	-	<0.1	-	<0.1			-
Endrin	mg/kg	<0.1	-	-	-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	-	<0.1	-	<0.1			-
Chlordane - Total	mg/kg	<0.1	-	-	-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	-	<0.1	-	<0.1			-
DDD+DDE+DDT	mg/kg	<0.1	-	-	-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	-	<0.1	-	<0.1			-
Hexachlorobenzene	mg/kg	<0.1	-	-	-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	-	<0.1	-	<0.1			-
Endrin Aldehyde	mg/kg	<0.1	-	-	-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	-	<0.1	-	<0.1			-
a-BHC	mg/kg	<0.1	-	-	-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	-	<0.1	-	<0.1			-
b-BHC	mg/kg	<0.1	-	-	-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	-	<0.1	-	<0.1			-
d-BHC	mg/kg	<0.1	-	-	-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	-	<0.1	-	<0.1			-
g-BHC	mg/kg	<0.1	-	-	-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	-	<0.1	-	<0.1			-
Heptachlor Epoxide	mg/kg	<0.1	-	-	-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	-	<0.1	-	<0.1			-

TABLE NOTES:

BOLD

1 – Total Chromium analytical result includes chromium (III) and (VI).

2 - Scheduled chemical include some organochlorine pesticides, phenolics and SVOCs. The sum of the SCC for all scheduled chemicals must not exceed the criteria. Some scheduled chemicals were not analysed but they were not chemicals of concern for the site.

TABLE 6 - Waste Classification Chemical Results (NON ACM CONTAMINATED FILL MATERIAL)

Sample ID		ZZ220623-74	ZZ220623-75	ZZ220623-77	ZZ220623-80	ZZ220623-83	ZZ220623-85	ZZ220623-211	ZZ220623-87	ZZ280723-C1	ZZ280723-C4	ZZ280723-C7	ZZ280723-C8	ZZ280723-R1	ZZ280723-R3	ZZ280723-R6	ZZ280723-D1	ZZ280723-R8	ZZ280723-R11	Maximum Result	Waste Classification Criteria				
Analyte	Location	BH30	BH30	BH31	BH32	BH33	BH34	Split	BH35	BH-C1	BH-C4	BH-C3	BH-C5	BH-R1	BH-R2	BH-R3	Blind	BH-R4	BH-R5		General Solid Waste (Without TCLP)	General Solid Waste (With TCLP Data)			
	Depth	0.1 - 0.2	0.6 - 0.7	0.1 - 0.2	0.1 - 0.2	0.1 - 0.2	0.1 - 0.2	0.1 - 0.2	Duplicate of	0.1 - 0.2	0.15 - 0.25	0.15 - 0.25	0.05 - 0.25	0.05 - 0.15	0.05 - 0.2	0.05 - 0.25	0.05 - 0.2	Replicate of	0.05 - 0.15			0.05 - 0.2	CT1 (mg/kg)	SCC1 (mg/kg)	TCLP1 (mg/L)
	Type	Fill-Gravelly SAND	Fill - Gravelly CLAY	Fill - Gravelly CLAY	Fill - Gravelly CLAY	Fill - Gravelly CLAY	Fill-Silty CLAY	Fill-Gravelly CLAY	ZZ220623-86	Fill-Gravelly SAND	FILL - Silty CLAY	FILL - SAND	FILL - SAND	FILL - SAND	FILL - SAND	Topsoil/FILL - SAND		Topsoil/FILL: Sand	ZZ280723-R6			FILL - Silty CLAY		FILL - Gravelly CLAY	SCC1 (mg/kg)
Asbestos																									
Asbestos Detected	Yes/No	No	-	No	-	No	No	-	No	No	No	No	No	No	No	No	-	No	No	No	-	-	-	-	
Respirable Fibres	Yes/No	No	-	No	-	No	No	-	No	No	No	No	No	No	No	No	-	No	No	No	-	-	-	-	
Metals																									
Arsenic (Total)	mg/kg	<4	5	12	9	8	10	14	<4	11	11	4	7	4	9	8	6	18	5	18	18	100	-	-	
Cadmium (Total)	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	20	-	-	
Chromium ¹ (Total)	mg/kg	16	19	17	17	20	25	25	7	17	20	12	14	11	16	17	15	16	13	25	100	-	-		
Copper (Total)	mg/kg	65	57	50	24	57	29	15	64	13	11	27	19	13	19	12	15	15	12	65	-	-	-		
Lead (Total)	mg/kg	4	10	10	86	390	12	5	60	15	31	40	30	40	18	25	33	28	17	390	100	1,500	-	-	
Lead (TCLP)	mg/L	-	-	-	-	0.54	-	-	-	-	-	-	-	-	-	-	-	-	-	0.54	-	-	5		
Mercury (Total)	mg/kg	0.1	<0.1	0.3	0.2	0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.6	4	-	-		
Nickel (Total)	mg/kg	47	26	17	17	10	8	4	21	2	9	10	8	8	6	8	8	5	12	47	40	1,050	-	-	
Nickel (TCLP)	mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.06	-	-	2		
Zinc (Total)	mg/kg	29	30	24	150	260	18	26	57	9	51	100	65	39	15	35	37	57	21	260	-	-	-		
BTEXN																									
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	-	<0.2	<0.2	<0.2	<0.2	10	-	-	
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	288	-	-	
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	-	<1	<1	<1	<1	600	-	-	
Total Xylenes	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	-	<1	<1	<1	<1	1,000	-	-	
Naphthalene	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	-	<1	<1	<1	<1	-	-	-	
TRH																									
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	-	-	-	<25	<25	<25	<25	650	-	-	
TRH >C ₁₀ -C ₄₀	mg/kg	<100	<100	<100	<100	<100	<100	<100	390	<100	<100	<100	<100	<100	-	-	-	<100	<100	340	10,000	-	-	-	
PAHs																									
Benzo(a)pyrene (Total)	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.2	<0.05	<0.05	-	-	-	<0.05	<0.05	0.2	0.8	-	-	-	
Total PAHs	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1.7	<0.05	<0.05	-	-	-	<0.05	<0.05	1.7	200	-	-	-	
PCBs																									
Total PCBs	mg/kg	<0.1	-	-	-	-	-	-	0.6	<0.1	-	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	50	-	-	
Scheduled Chemicals ²																									
Heptachlor	mg/kg	<0.1	-	-	-	-	-	-	<0.1	<0.1	-	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<50 ²	<50 ²	-	
Aldrin	mg/kg	<0.1	-	-	-	-	-	-	<0.1	<0.1	-	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1			-	
Dieldrin	mg/kg	<0.1	-	-	-	-	-	-	<0.1	<0.1	-	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1			-	
Endrin	mg/kg	<0.1	-	-	-	-	-	-	<0.1	<0.1	-	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1			-	
Chlordane - Total	mg/kg	<0.1	-	-	-	-	-	-	<0.1	<0.1	-	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1			-	
DDD+DDE+DDT	mg/kg	<0.1	-	-	-	-	-	-	<0.1	<0.1	-	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1			-	
Hexachlorobenzene	mg/kg	<0.1	-	-	-	-	-	-	<0.1	<0.1	-	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1			-	
Endrin Aldehyde	mg/kg	<0.1	-	-	-	-	-	-	<0.1	<0.1	-	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1			-	
a-BHC	mg/kg	<0.1	-	-	-	-	-	-	<0.1	<0.1	-	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1			-	
b-BHC	mg/kg	<0.1	-	-	-	-	-	-	<0.1	<0.1	-	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1			-	
d-BHC	mg/kg	<0.1	-	-	-	-	-	-	<0.1	<0.1	-	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1			-	
g-BHC	mg/kg	<0.1	-	-	-	-	-	-	<0.1	<0.1	-	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1			-	
Heptachlor Epoxide	mg/kg	<0.1	-	-	-	-	-	-	<0.1	<0.1	-	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1			-	

TABLE NOTES:

BOLD

1 – Total Chromium analytical result includes chromium (III) and (VI).

2 - Scheduled chemical include some organochlorine pesticides, phenolics and SVOCs. The sum of the SCC for all scheduled chemicals must not exceed the criteria. Some scheduled chemicals were not analysed but they were not chemicals of concern for the site.

TABLE 6 - Waste Classification Chemical Results (NON ACM CONTAMINATED FILL MATERIAL)

Sample ID		ZZ280723-R13	ZZ280723-R16	ZZ280723-R17	ZZ280723-R18	ZZ280723-R22	ZZ280723-R24	SM280723-R30	SM280723-01	SM280723-100	SM280723-03	SM280723-101	SM280723-04	SM280723-06	SM280723-102	SM280723-08	SM280723-103	Maximum Result	Waste Classification Criteria			
Analyte	Location	BH-R6	BH-R7	BH-R7	BH-R8	BH-R9	BH-R10	BH-R11	BH-R14	Blind	BH-R15	Split	BH-R15	BH-R16	Blind	BH-R17	Split		General Solid Waste (Without TCLP)	General Solid Waste (With TCLP Data)		
	Depth	0.05 – 0.15	0.05 – 0.15	0.5 – 0.6	0.05 – 0.15	0.05 – 0.15	0.05 – 0.15	0.05 – 0.15	0.05 – 0.25	Replicate of	0.05 – 0.25	Duplicate of	0.4 – 0.5	0.05 – 0.25	Replicate of	0.05 – 0.25	Duplicate of			CT1 (mg/kg)	SCC1 (mg/kg)	TCLP1 (mg/L)
	Type	FILL – Gravelly CLAY	FILL – Gravelly CLAY	FILL – Gravelly CLAY	Topsoil/FILL: Sand	FILL – Gravelly CLAY	Topsoil/FILL: Sand	FILL – Gravelly CLAY	FILL – Silty CLAY	SM280723-01	FILL – Sandy CLAY	SM280723-03	FILL – Silty CLAY	FILL – Silty Gravelly CLAY	SM280723-06	FILL – Silty Gravelly CLAY	SM280723-08					
Asbestos																			-	-	-	-
Asbestos Detected		Yes/No	No	No	-	No	No	No	No	No	-	No	-	-	No	-	No	-	-	-	-	
Respirable Fibres		Yes/No	No	No	-	No	No	No	No	No	-	No	-	-	No	-	No	-	-	-	-	
Metals																						
Arsenic (Total)		mg/kg	6	6	5	5	7	12	12	15	13	18	15	10	14	13	12	10	18	100	-	-
Cadmium (Total)		mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	20	-	-
Chromium ¹ (Total)		mg/kg	13	13	11	8	19	16	38	29	38	26	28	21	30	25	26	25	38	100	-	-
Copper (Total)		mg/kg	25	13	14	9	24	49	11	12	12	8	7	12	8	9	8	8	49	-	-	-
Lead (Total)		mg/kg	52	22	19	21	29	21	35	110	84	44	27	150	24	28	87	93	150	100	1,500	-
Lead (TCLP)		mg/L	-	-	-	-	-	-	<0.03	-	-	-	-	<0.03	-	-	-	-	0	-	-	5
Mercury (Total)		mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	4	-	-
Nickel (Total)		mg/kg	9	7	3	4	17	10	5	5	4	3	5	3	5	5	6	5	17	40	1,050	-
Nickel (TCLP)		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	2
Zinc (Total)		mg/kg	81	48	15	57	66	130	53	95	89	21	13	220	22	24	53	57	220	-	-	-
BTEXN																						
Benzene		mg/kg	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	10	-	-
Toluene		mg/kg	<0.5	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	288	-	-
Ethylbenzene		mg/kg	<1	<1	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	600	-	-
Total Xylenes		mg/kg	<1	<1	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1,000	-	-
Naphthalene		mg/kg	<1	<1	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	-
TRH																						
TRH C ₆ - C ₉		mg/kg	<25	<25	-	-	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	650	-	-
TRH >C ₁₀ -C ₄₀		mg/kg	<100	<100	-	-	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	340	10,000	-	-
PAHs																						
Benzo(a)pyrene (Total)		mg/kg	0.2	<0.05	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.2	0.8	-	-
Total PAHs		mg/kg	1.7	<0.05	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1.7	200	-	-
PCBs																						
Total PCBs		mg/kg	-	<0.1	-	-	<0.1	-	<0.1	<0.1	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1	50	-	-
Scheduled Chemicals ²																						
Heptachlor		mg/kg	-	<0.1	-	-	<0.1	-	<0.1	<0.1	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1	<50 ²	<50 ²	-
Aldrin		mg/kg	-	<0.1	-	-	<0.1	-	<0.1	<0.1	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1			
Dieldrin		mg/kg	-	<0.1	-	-	<0.1	-	<0.1	<0.1	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1			
Endrin		mg/kg	-	<0.1	-	-	<0.1	-	<0.1	<0.1	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1			
Chlordane - Total		mg/kg	-	<0.1	-	-	<0.1	-	<0.1	<0.1	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1			
DDD+DDE+DDT		mg/kg	-	<0.1	-	-	<0.1	-	<0.1	<0.1	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1			
Hexachlorobenzene		mg/kg	-	<0.1	-	-	<0.1	-	<0.1	<0.1	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1			
Endrin Aldehyde		mg/kg	-	<0.1	-	-	<0.1	-	<0.1	<0.1	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1			
a-BHC		mg/kg	-	<0.1	-	-	<0.1	-	<0.1	<0.1	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1			
b-BHC		mg/kg	-	<0.1	-	-	<0.1	-	<0.1	<0.1	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1			
d-BHC		mg/kg	-	<0.1	-	-	<0.1	-	<0.1	<0.1	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1			
g-BHC		mg/kg	-	<0.1	-	-	<0.1	-	<0.1	<0.1	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1			
Heptachlor Epoxide		mg/kg	-	<0.1	-	-	<0.1	-	<0.1	<0.1	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1			

TABLE NOTES:

BOLD

1 – Total Chromium analytical result includes chromium (III) and (VI).

2 - Scheduled chemical include some organochlorine pesticides, phenolics and SVOCs. The sum of the SCC for all scheduled chemicals must not exceed the criteria. Some scheduled chemicals were not analysed but they were not chemicals of concern for the site.



5.7.3 Final Waste Classification

The ACM contaminated fill layer which is the subject of this RAP (refer to the red shaded area in **Figure 5**) is classified as Special Waste Asbestos, while the chemical assessment confirmed that the waste may be disposed at a General Solid Waste Landfill which is also licenced to accept asbestos. All the remaining fill material which is not impacted by ACM has a preliminary waste classification of General Solid Waste (non-putrescible).



6 CONCEPTUAL SITE MODEL

The conceptual site model (CSM) is a representation or summary of information obtained regarding potential contamination sources, receptors and exposure pathways between the sources and receptors. The key elements of a CSM include:

- ◇ known and potential sources of contamination and contaminants of concern, including the mechanisms of contamination (such as 'top down' spills or sub-surface releases from corroded tanks or pipes),
- ◇ potentially affected media (such as soil, sediment, groundwater, surface water, indoor and ambient air),
- ◇ human and ecological receptors, and
- ◇ potential and complete exposure pathways.

GEE notes that this CSM is based on existing information and the CSM should be revised if additional site contamination is encountered during remediation works.

6.1 *KNOWN CONTAMINANTS OF CONCERN*

The known contaminants of concern for the site is bonded ACM which was found at the surface and at depth within a layer of fill material across parts of the site. These areas are shown on **Figure 5**.

6.2 *CONTAMINANT SOURCES*

The exact source of all the ACM fragments is not known. However, they are likely to have originated from the demolition of former structures across the site which contained ACM.

6.3 *POTENTIAL OR KNOWN CONTAMINATED MEDIA*

The contaminated media is surface fill material in parts of the site as shown on **Figure 5**. There is also some sporadic surface ACM in parts of the site. The natural soil profile is free of contamination and there is no evidence or likelihood of groundwater or vapour contamination issues.

6.4 *CONTAMINANT RECEPTORS*

Potential receptors to the contamination (if not remediated) include:



Human Receptors

- ◇ Workers engaged to undertake the proposed remediation works,
- ◇ Surrounding landowners if the ACM is allowed to degrade and asbestos fibres become airborne.

6.5 POTENTIAL AND COMPLETE EXPOSURE PATHWAYS

There currently exists a complete exposure pathway to the ACM. This will also be the case during remediation phase.



7 REMEDIATION STRATEGY

This section provides the remediation goal, the extent of remediation required and discusses the remedial options to determine the preferred remedial option.

7.1 REMEDIATION GOAL

The goal of the remediation activities is to render the site suitable for the proposed residential development with accessible soils (**Appendix A**).

7.2 EXTENT OF REMEDIATION

As summarised in Section 5.6 ACM, specifically fragments of non-friable/bonded asbestos (fibro) is present within fill material across the western part of the site (shown as red shading on **Figure 5**). Based on our previous field investigations, it is estimated that the ACM contaminated fill covers an area of approximately 5,500m² and has an average depth of approximately 0.9m. This equates to an estimated volume of 5,000m³ or 9,000 tonnes if assuming a density of 1.8t/m³.

There also exists some surface ACM debris across part of the western half of the site (shown as hatched area on **Figure 5**). Based on our field observations the surface ACM debris extends across an area of approximately 3,000m².

Finally, it is noted that no friable asbestos was identified in soil samples analysed as part of the previous investigations.

7.3 REGULATORY POLICY OF REMEDIATION

According to the National Environment Protection (Assessment of Site Contamination) Measure (amended 2013) (reference 6 and herein referred to as '*ASC NEPM*'), which is endorsed by the NSW EPA and compatible with the CRC Care National Remediation Framework (reference 7), the preferred hierarchy of options for site remediation and management of soil contamination is:

- i) On-site remediation of soil contamination, so that the risk associated with the contaminant is reduced to an acceptable level.*
- ii) Off-site remediation of excavated soil, so that the risk associated with the contaminant is reduced to an acceptable level, after which it is returned to the site.*

If it is not possible for either of the above options to be implemented, then other options for consideration can include, for example:



- i) Containment of the contamination on-site either in-situ with appropriate controls that reduce the risk to an acceptable level, or in an appropriately designed and managed containment facility.
- ii) Removal of contaminated soil to an approved site or facility, and replacement with clean fill where necessary.
- iii) Adoption of a less sensitive land use or controls on site activities that will reduce the need for remedial works.

As part of the identification and selection of remediation options, consideration should be given to the hierarchy above so that remedial options are selected that provide a permanent solution without the need for ongoing control, where feasible.

7.4 ASSESSMENT OF REMEDIATION OPTIONS

A summary of the soil remediation options and assessment of the suitability of each is provided in **Table 7**.

Table 7: Summary of the Soil Remedial Options

Remediation Option	Assessment	Conclusion
1. On-site treatment of the soil	Not applicable for Asbestos	Unfeasible
2. Off-site treatment of excavated soil.	Not applicable for Asbestos	Unfeasible
3. Removal of contaminated soil to an approved site or facility.	There are currently suitably licensed waste facilities in the Sydney region capable of accepting the asbestos found at the site. This option generates additional truck movements and associated fuel/emissions over option 4. This option also generates the highest quantity of waste, since the materials are disposed to landfill rather than retained on Site. Finally, it is also an uncomplicated strategy that is time effective and excavation in this part of the site is already proposed as part of the proposed development basement.	Preferred option, given the relatively small quantity involved and lack of reliable and cost-effective treatment processes



4. Consolidation and isolation of the soil on-site.	Asbestos is considered suitable for consolidation and isolation within an on-site containment structure, given that they are relatively immobile and not volatile. This strategy would require approval from the consent authority, a long-term management plan and long-term design integrity monitoring program. It is also not considered cost effective or appropriate given the relatively small volumes of soil that requires remediation	Suitable but excavation is proposed as part of the proposed development so it will be excavated. Therefore this option is not preferred.
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7.5 **PREFERRED REMEDIATION OPTION**

In consideration of the hierarchy for soil remediation options outlined above, the specific contaminants identified on the site, the quantities involved and the fact that a significant volume of fill and natural soil will require excavation and removal from site as part of the proposed development, the preferred remediation option is removal and off-site disposal of the ACM impacted fill and the surface ACM debris. The above option is also consistent with the recommended approach outlined in the WorkCover NSW 2014 Guidance document entitled "*Managing asbestos in or on soil*" (reference 8).

ACM is likely to also be present within existing structures on the site which are proposed to be demolished as part of the proposed development. Therefore, GEE recommends that the remediation work be completed after Construction Certificate (CC Stage) and after demolition of the onsite structures. This would ensure that any residual contamination from the demolition works is also managed during the remediation works described herein.

The validation report should then be a necessity for issue of the Occupation Certificate (OC).



8 REMEDIATION METHODOLOGY

This section outlines the scope of the remediation works and provides detail of the proposed methodology of each of the required remediation tasks.

8.1 REMEDIATION SCOPE OF WORK

The scope of remediation works that is required to be undertaken on the site under this RAP comprises the following:

1. Obtain necessary approval from Council,
2. Complete a Hazardous Material Audit (HMA) of the existing structures,
3. Organise an appropriate contractor to undertake the remediation work,
4. Organise an appropriate contractor to undertake the remediation work,
5. Controlled excavation and landfill disposal of the ACM impacted fill,
6. Controlled removal of the remaining surface ACM debris,
7. Validation of remediation works, and
8. Preparation of a validation report.

8.2 REMEDIATION METHODOLOGY

The methodologies to be undertaken on the site for the various components of the remediation works are presented in detail in the sections below.

8.2.1 Task 1 - Obtain Council Approval

Chapter 4 of the SEPP (Resilience and Hazards) 2021 specifies when development consent is required and when it is not required. Category 1 work requires a separate development consent and requires advertisement of the remediation work for 30 days pursuant to Clause 13 of SEPP 55. Category 2 remediation work does not require development consent; however, Council is required to be notified 30 days prior to commencement of the remediation work.

It is the opinion of GEE that the remediation works described in the RAP would fall under Category 2 remediation work for the following reasons:

- ◇ The work is not designated development under schedule 3 of the *Environmental Planning and Assessment Act 1979* (NSW) as the treatment of contaminated soil originating exclusively from the site on which the development is located will not exceed 30,000 m³ of soil and disturb an aggregate area greater than 3 Ha,



- ◇ The land is not identified as critical habitat under the Threatened Species Conservation Act 1995 (NSW),
- ◇ Remediation is not being conducted in an area that requires consideration under s. 5A of the Environmental Planning and Assessment Act 1979 (NSW), and
- ◇ Remediation is not being performed in an area of environmental significance or which requires consent under another State Environment Planning Policy (SEPP) or a regional environmental plan.

In this regard, and in accordance with Chapter 4.13 of SEPP (Resilience and Hazards) 2021, Council notification is required 30 days prior to commencing work.

8.2.2 Task 2 – Complete a Hazardous Materials Audit (HMA) of the existing structures

Under the Work Health and Safety Regulations 2017, all asbestos containing materials present in a building must be identified and removed prior to demolition works commencing. Other hazardous building materials must also be identified to ensure safety and correct disposal is undertaken.

As a minimum, the Hazardous Building Materials Audit will determine the presence of:

- ◇ Asbestos Containing Materials (ACMs).
- ◇ Lead paint.
- ◇ Polychlorinated Biphenyls (PCBs).

8.2.3 Task 3 – Demolish existing structures and pavements

As mentioned in Section 7.5, existing structures which will ultimately be demolished for the proposed development are likely to also contain ACM. In this regard, GEE recommends that the remediation work be completed after CC and after the demolition of existing structures. This would ensure that any residual contamination from the demolition works is also managed during the remediation works described herein.

All demolition work must comply with the Australian Standard AS2601 – 1991 – *The Demolition of Structures* and the *Work Health and Safety Regulation 2017*. Furthermore, care should be taken by the demolition contractor to minimise soil disturbance which may result in spreading any ACM across the site.



8.2.4 Task 4 - Organise an appropriate contractor

According to SafeWork NSW (reference 9), a contractor that holds a Class A and B asbestos removal licence can remove any amount of non-friable asbestos or ACM.

All asbestos removal work must be undertaken safely in accordance with the work health and safety legislation. Additionally, all workers must be suitably trained in asbestos removal techniques that include identification, safe handling and suitable control measures and they must hold current certification showing that they have successfully completed the approved non-friable removal course.

8.2.5 Task 5 - Controlled excavation and landfill disposal of the ACM impacted fill

The entire aesthetically impacted fill layer will require controlled excavation and removal from site. As mentioned in Section 5.7, the ACM impacted fill may be disposed at a landfill licenced to accept General Solid Waste (GSW) and Asbestos Waste. Additionally, the landfill should be notified in advance of the waste delivery (reference 8).

The quantity of asbestos is likely to exceed 10 square metres, therefore, the asbestos waste will also be tracked using the NSW EPA's WasteLocate. Landfill receipt dockets will need to be kept for inclusion within the validations report as a record of the disposal of the material.

8.2.6 Task 6 - Controlled excavation and landfill disposal of the surface ACM debris

The fragments of ACM may be removed by hand-picking, tilling or screening while applying suitable Workplace Health and Safety (WHS) practices. It should also be completed in the presence of a licenced asbestos assessor or occupational hygienist.

A grid pattern should be applied to ensure a structured and systematic approach to assessment and removal. Upon completion, no visible asbestos fragments should be present on the surface. Where practicable, the top 10cm of wetted soil should be gently raked to expose any residual asbestos fragments.

The collected waste material should then be securely wrapped in plastic sheeting and taken to an appropriate landfill for disposal and the landfill notified in advance of the waste delivery (reference 8).

If the asbestos waste exceeds 100 kilograms, or comprises more than 10 square metres of ACM, then the waste must be tracked using the NSW EPA's WasteLocate system. Finally,



regardless of the volume of asbestos waste generated, landfill receipt dockets will need to be kept for inclusion within the validations report as a record of the disposal of the material.

8.2.7 Task 7 - Validation sampling and analysis

Following removal of the fill layer and waste debris, a programme of soil validation will be implemented as described in Section 10. The validation programme will include the sampling and analysis of soil from across the entire site.

Additionally, an independent occupational hygienist or licenced asbestos assessor will need to be engaged to undertake a clearance inspection at the completion of the removal work and issue an asbestos clearance certificate which states that the site is safe for the proposed land-use.

Should there remain ACM on the surface of the site or in the validation samples then task 5 should be repeated followed by additional validation sampling and analysis.

8.2.8 Task 6 - Validation reporting

At the completion of the remediation works, a validation report will be prepared which outlines the results of the remediation works undertaken at the site and an assessment of the suitability of the site for the proposed use. The report will serve to document the remediation works for future reference and should be necessary for issue of the Occupation Certificate (OC).



9 REMEDIATION WORKS CONTINGENCY PLAN

GEE anticipates that remediation methodology described in Section 8 above will ensure that the site is suitable for the proposed land-use. However, the following potential contingencies and proposed actions outlined in **Table 8** will be taken:

Table 8: Contingencies

Issue	Action
1. Failure of the validation testing, indicating a greater amount of contamination than anticipated.	Further stripping of surficial soils and any ACM and validation sampling.
2. Generation of unacceptable odours from the remediation works.	Refer to section 13.2
3. The generation of unacceptable levels of dust during remediation works.	Refer to section 13.2
4. Generation of unacceptable noise during site works.	Refer to section 13.3
6. Unexpected find of volatile contamination	Refer to section 9.1.1

9.1 UNEXPECTED FINDS PROTOCOL

During the remediation work an experienced contaminated land consultant should be present to ensure that there is no evidence of other contaminants i.e. discolouration, staining, detectable organic odours, residues, or evidence of underground storage tanks.

If evidence of contamination is observed, the following procedure should be adopted:

- ◇ Cease disturbance of the material.
- ◇ Contact the Site Foreman or appropriate Manager.
- ◇ Contact Council.
- ◇ If the tank/drum or volatile odour are suspected, then adopt the protocols in the following sub-sections. Otherwise, conduct a visual assessment of the potential contamination in the presence of the site foreman / sit manager and collected samples as necessary for analysis by a NATA accredited laboratory. This should include appropriate waste classification if removed from site,
- ◇ Define the location using a GPS or measurements from the boundaries or existing structures which are likely to remain in the long term.



- ◇ While waiting for the results of the assessment, arrange for the area to be barricaded to provide a ten (10) metre exclusion zone. Work can recommence in adjacent areas outside the exclusion zone.
- ◇ Once the results of the assessment are known then the waste material should be removed to a landfill facility licenced to accept the waste.

9.1.1 Volatile Contaminants

Based on the findings of the previous assessments and noting the nature of the filling and soil encountered at the site the potential for the site being impacted by volatile contaminants would be extremely low.

In the highly unlikely event that significant quantities of volatile compounds are detected, then appropriate gas mitigation strategies may be required as per ANZECC (1999) Guidelines for the Assessment of On-site Containment of Contaminated Soil.

If impacts due to volatile contaminants are detected across the site, the nature and extent of the impacts of the volatile contaminants should be established as a first step before an appropriate remedial strategy is to be established. If feasible the source material should be removed for off-site disposal.

9.1.2 Buried Tanks / Drums

In the unlikely event that buried structures such as Underground Storage Tanks (USTs) are encountered during site works, the structure(s) and any associated pipe-work should be managed / removed as per the NSW EPA, 2014: *Technical Note: Investigation of Service Station Sites* (reference 9).



10 VALIDATION PLAN

A validation plan will be implemented on the site to ensure that the RAP has been followed and that the remediation goal has been achieved. The purpose of the validation plan is to develop a framework for the validation of the site to verify the suitability of the site for the proposed use.

Requirements for the sampling and analytical plan, sampling methodology and quality control/quality assurance procedures to be adopted for the validation works are presented below. Additionally, in accordance with NSW EPA *Contaminated Sites: Guidelines for NSW Site Auditor Scheme* (reference 10) and Appendix B of Schedule B2 of the NEPM (reference 11), the Data Quality Objectives (DQOs) process was used to define the type, quantity and quality of the data needed to support decisions relating to the contamination status of the site. Details of the DQO process adopted for the soil sampling and analysis program is provided in **Appendix D**.

10.1 SCOPE OF THE VALIDATION WORKS

The scope of work that is required to be undertaken during the validation on the site comprises the following:

- ◇ Validation sampling of the surface soil following removal of the ACM impacted fill and the surface ACM debris. The purpose of this is to check if there is friable asbestos remaining,
- ◇ Inspection of the remaining surface across the footprint of the ACM impacted fill by an independent occupational hygienist or licenced asbestos assessor,
- ◇ Preparation of a Validation Report.

10.2 SAMPLING PLAN

10.2.1 Sampling Locations and Frequency

Natural Soil Profile

GEE proposes to collect a total of 19 samples from across the remediation area of approximately 8,500m². This equates to approximately 22 sampling points per hectare and a sampling grid of 21m which meets the minimum number of samples recommended from the NSW EPA Sampling Design Guidelines (reference 12). Samples will be collected with the assistance of a shovel taking care to sample soil which has not been in contact with the shovel.



10.2.2 Handling, Containment and Transport of Samples

The soil samples will be collected in a plastic, zip-lock bag, and filled with at least 500g of soil. The samples will then be sealed, labelled with the job number, date, unique sampling point identification and depth.

The samples will then be transported directly to the laboratory through chain-of-custody (COC) procedures. The COC form (provided by the laboratory) will demonstrate that the samples are properly received, documented, processed and stored.

10.2.3 Decontamination of Sampling Equipment

Considering that samples will be collected by hand using a new set of disposable nitrile gloves, decontamination will not be necessary as no re-useable equipment will be used. Additionally, when sampling using a shovel, care will be taken to ensure that the soil sampled did not contact the shovel.

However, if the assistance of a trowel is required to collect samples, in situations of hard or well compacted ground) then the trowel will be decontaminated by washing with a laboratory grade, biodegradable and phosphate-free detergent followed by rinsing with potable water.

10.3 ANALYTICAL PLAN

Each validation sample collected will be analysed for the contaminant of concern which is asbestos. The samples will be analysed in accordance with the WA DoH guidelines (reference 13), which have been adopted nationally (reference 14).

10.4 QUALITY ASSURANCE

Quality Assurance (QA) involves all the actions, procedures, checks and decisions undertaken to ensure the representativeness and integrity of samples and accuracy and reliability of analysis results (reference 10).

In accordance with AS4482.1 (reference 15) and NEPM (reference 10), a series of QA procedures will be integrated within the sampling and analysis plan and include:

- ◇ The use of standardised field sampling forms developed by GEE.
- ◇ Documentation of calibration and use of field instruments.



To ensure QA in the field, samples will be collected by experienced and trained personnel using appropriate methods detailed herein, including appropriate sample handling, containment and transport, and calibrated equipment.

To ensure QA in the laboratory, GEE intend to use laboratories that are NATA accredited for the analytical tests carried out, therefore it is reasonable for GEE to rely on the laboratories to be proficient in all tests conducted. This encompasses all actions, procedures, checks and decisions undertaken, to ensure the accuracy and reliability of the analysis results.

10.4.1 Quality Control

QC involves those parts of QA which serve to monitor and measure the effectiveness of QA procedures. QC samples assess sample integrity, accuracy and precision and can be separated into field and laboratory QC. For asbestos sampling QC samples are not considered to be necessary because of the nature of the contaminant.

10.5 INSPECTION AND CLEARANCE CERTIFICATE

To check that all the surface ACM has been removed, an independent occupational hygienist will be engaged to undertake a clearance inspection at the completion of the removal work and issue an asbestos clearance certificate which states that the site is safe for the proposed land-use.

10.6 VALIDATION REPORT

Consistent with NSW EPA requirements, a validation report will be prepared at the conclusion of remediation works. The validation report, prepared in accordance with the requirements of EPA guidelines (reference 16), will outline the results of the remediation works undertaken at the site and an assessment of the suitability of the site for the proposed use.



11 REMEDIATION ASSESSMENT CRITERIA

To determine the success of the proposed remediation plan it is necessary to define appropriate Remediation Assessment Criteria (RAC).

For asbestos in soil, GEE has adopted the Health Screening Levels (HSLs) developed by the WA DoH (reference 13) and which have been adopted in Schedule B(1) of NEPM (2013 – reference 14). The HSL asbestos in soil screening levels are based on scenario-specific likely exposure levels associated with land-use. Considering the proposed land-use, GEE has adopted criteria for residential sites with minimal access to soil – HSL-B.

A summary of the relevant RAC is provided in **Table 9**.

Table 9: Soil Remediation Assessment Criteria (RAC)

Analyte	Health Screening Levels (HSLs) (mg/kg)	
	HSL - B	Reference
Surface Soil	No visible Asbestos	Table 7 – Reference 14
Buried Bonded	0.01%	Table 7 – Reference 14
Buried Friable	0.001%	Table 7 – Reference 14



12 INTERIM SITE MANAGEMENT PLAN (SITE PREPARATION)

12.1 SERVICES AND UTILITIES

The only underground service on the site is a sewer pipe, the location of which is known and will be avoided.

12.2 SITE SECURITY, RESTRICTED ACCESS AND SIGNAGE

Access to site will be restricted during site redevelopment works as required by Council Development Application conditions.

12.3 STORMWATER CONTROL MEASURES

No stormwater control measures are proposed during the site preparation phase since the remediation works relate to surficial ACM.

12.4 OCCUPATIONAL HEALTH & SAFETY PLAN

All work associated with the decommissioning and remediation of the site would conform at a minimum, to the requirements of the NSW Occupational Health and Safety Act.

12.5 LICENCES AND APPROVALS

No specific licences are required for the remediation work proposed. However, approval for the work should be granted by Council depending on the category of the remediation work. For Category 1 works, which requires development consent, the proposed remediation work must be advertised for 30 days pursuant to Clause 13 of SEPP 55. For Category 2 works Council should be notified 30 days prior to commencing work. As mentioned in Section 8.2.1, GEE considers that the remediation work is Category 2.

12.6 CONTACT DETAILS

During Remediation work Stephen McCormack (02 9420 3361) from GEE may be contacted for advice and to arrange for validation testing.

12.7 COMMUNITY RELATIONS PLAN / CONSULTATION

A community relations plan is not considered necessary for the site.



13 SITE MANAGEMENT PLAN (OPERATIONAL PHASE)

Remediation works shall be conducted in a manner that minimises environmental impacts and that meets statutory requirements. Site works should comply with the following legislation:

- ◇ Contaminated Land Management Act (1997);
- ◇ Contaminated Land Management Amendment Act (2008);
- ◇ Protection of the Environment Operations Act (1997);
- ◇ Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation (2008);
- ◇ Environmentally Hazardous Chemicals Act (1985);
- ◇ Dangerous Goods Act (1975);
- ◇ Waste Avoidance and Resource Recovery Act (2001);
- ◇ Clean Air (Plant and Equipment) Regulation (1997);
- ◇ Occupational Health and Safety Act (2001); and
- ◇ Local Government Act (1993).

The contractor shall endeavour to:

1. Minimise fugitive dust emissions;
2. Minimise the volume of water containing suspended sediment leaving the site;
3. Prevent vehicles from tracking mud on local roads; and
4. Ensure that noise and vibration levels conform to legislative requirements.

A preliminary site management plan is provided below.

13.1 STORMWATER MANAGEMENT

Stormwater management is not expected to be required as no significant excavation is proposed as part of the remediation works.

13.2 CONTROL OF DUST AND ODOUR

The remediation work will be undertaken in a manner that minimises fugitive dust and odour emissions.



Measures to control dust and odour will include:

- ◇ Careful handling of material in a manner that minimises dust emissions;
- ◇ Placement of screening material (*e.g.*, hessian) on perimeter fences;
- ◇ Water spraying across dusty areas of the site;
- ◇ The use of tarpaulins or similar to cover loads (incoming and outgoing); and
- ◇ The restriction of stockpile heights to less than 2 m.

Where visual inspection indicates that dust levels may be unacceptable, work will cease until measures are taken to reduce emissions or until weather conditions improve. The site supervisor will be responsible for dust management.

Local Government requirements state that no odours shall be detected at the site boundary during remedial works by an authorised Council officer relying solely on the sense of smell. The following procedures may be engaged in order to minimise odours:

- ◇ Covering of stockpiles (where practical);
- ◇ Use of fine mist sprays and hydrocarbon mitigating agent on impacted areas and materials; and
- ◇ Adequate maintenance of equipment and machinery to minimise exhaust emissions.

13.3 NOISE CONTROL

Minor increased noise levels may result from the use of machines on site during the course of the project, which is expected to take less than 1 week day. To mitigate any noise which may arise as a result of site works, all works would be carried out in accordance the EPA NSW *Interim Construction Noise Guideline* (reference 16).

Working hours will be restricted to those specified in the DA consent conditions for the proposed development.

13.4 VIBRATION CONTROL

No significant excavation is proposed as part of the remediation works and therefore vibration is not expected to be an issue for adjoining structures.



13.5 TRAFFIC AND TRANSPORT

Traffic disruptions may potentially be an issue as a result of site remediation works mostly associated with the any truck movements when demolition occurs. Methods such as using a skip or transporting materials to and from site using a barge should be considered in order to alleviate traffic impact.

All machinery will be transported to the site in accordance with regulatory requirements.

All haulage routes for trucks transporting soil, materials, equipment or machinery to and from the site are to be selected to meet the following requirements:

- ◇ Comply with all road traffic rules;
- ◇ Minimise noise, vibration and odour to adjacent properties; and
- ◇ Utilise State Roads and minimise the use of local roads.

The site supervisor shall ensure that all vehicles:

- ◇ Conduct deliveries of soil, materials, equipment of machinery during the allowed hours of remediation work;
- ◇ Securely cover all loads to prevent/minimise any dust or odour emissions during transport; and
- ◇ Do not track soil, mud or sediment onto the roads and footpaths.

13.6 UNDERGROUND SERVICES

All underground services are to be located and either removed or avoided.

13.7 RESTRICTED ACCESS

Contractors only will be allowed on site during demolition works. No members of the public will be allowed on site during this time.

During remediation works, the site will be designated as a construction area. Consequently, access will be restricted to authorised staff and contractors equipped with appropriate Personal Protective Equipment (PPE). The site supervisor will control site access. All visitors will report to the site supervisor to be inducted into the site safety programme and environmental protection programme prior to entering the site.



14 WORKPLACE HEALTH AND SAFETY PLAN

The purpose of Workplace Health and Safety (WHS) is to ensure that the RAP is conducted in a controlled and safe manner with due regard for potential hazards and safe work practices. The WHS plan will be implemented and enforced by the appointed site supervisor following a brief induction by GEE. The following preliminary plan contains minimum WHS requirements at the site. Contractors must be required to produce their own project-specific Project Safety Plans prior to the commencement of any works at the site, under which their employees are to operate at all times whilst at the site.

14.1 PERSONNEL AND RESPONSIBILITY

All personnel will be made aware of the person responsible for implementing health and safety procedures. All personnel should read and understand the WHS plan prior to commencing work and have signed a statement to verify this understanding. Contractors shall be responsible for ensuring that their employees are aware of and comply with the Project Safety Plans developed for each task and with all relevant statutes and regulations.

14.2 IDENTIFICATION OF POTENTIAL HAZARDS

14.2.1 Chemical Hazards

Contaminants that may be present at the site include, but are not limited to:

- ◇ Asbestos

Potential risks to personnel associated with these compounds, if present at the site, include inhalation of dust containing the contaminants.

14.2.2 Physical Hazards

The following physical hazards may exist at the site:

- ◇ Heavy equipment (mobile and stationary);
- ◇ Light vehicles with associated traffic and vehicle hazards;
- ◇ Heat exposure;
- ◇ Buried Services;
- ◇ Noise;
- ◇ Dust;
- ◇ Electrical equipment.



Personnel should also be aware of the necessary precautions with respect to hoisting of people, smoking, drugs and alcohol, first aid, privacy of information, environmental considerations, health surveillance, working alone, incident reporting, WHS consultation, discrimination and sexual harassment.

14.3 MEDICAL SURVEILLANCE

It is expected that all personnel on the site have undergone specific training for working on contaminated sites. A site-specific medical surveillance scheme is not considered necessary for this project.

14.4 SITE WORK PRACTICES

14.4.1 Personal hygiene

No smoking, eating or drinking will be permitted on site in areas where the possibility of contamination exists. In particular, smoking will be prohibited in areas where volatile hydrocarbons or other inflammable materials have accumulated. In these areas, a designated clean location should be allocated for smoking and the consumption of food or drink. These areas should be equipped with hand washing facilities which must be used prior to engaging in these activities. Personnel should be made aware of the location of these facilities.

14.4.2 Decontamination

Contaminated equipment should not be removed from the work area to avoid contaminating other parts of the site.

14.4.3 Restricted Access

A perimeter fence exists and will remain during the remediation work. Signs should be erected to notify personnel of the presence of asbestos removal in progress. Site visitors must report to the site office prior to entering the site.

14.4.4 Personal protection

Personnel will take measures to avoid coming into direct contact with contaminated material. Workers are to ensure that soil, surface water or groundwater are not ingested or swallowed and that direct contact with skin is avoided. Personnel should wear the following Personal Protective Equipment (PPE):

- ◇ Steel-capped boots meeting AS2210.3 requirements (reference 17);



- ◇ Fluorescent safety vest or other high visibility clothing conforming to AS/NZS 4602:1999 (reference 18);
- ◇ Hard hat meeting AS1801-1981 (reference 19) requirements when working within close proximity to any heavy machinery;
- ◇ Safety glasses or goggles with side shields meeting AS1337.6-2007 (reference 20) requirements as necessary; and
- ◇ Disposable latex gloves for personnel involved in soil or groundwater sampling.

In the unlikely event that personnel are required to work in areas with highly-contaminated soil or other hazardous materials, the following additional protection will be required:

- ◇ Disposable coveralls (if necessary) to prevent contact with splashed soil or materials; and
- ◇ Nitrile gloves meeting AS2161-2000 (reference 21) requirements or heavy-duty gauntlet gloves.

14.5 EMERGENCY RESPONSE PLAN

14.5.1 Resources

The following emergency numbers can be called in the event that medical or other emergency services are required:

Hospital: Fairfield Hospital
 Polding St & Prairie Vale Road, Prairiewood NSW 2176
 (02) 9616 8111

Police, fire, ambulance: 000

Electrical: Energy Australia
 13 13 18

Council: Fairfield City Council
 86 Avoca Road Wakeley NSW 2176
 (02) 9725 0222

Water: Sydney Water
 132 090

Gas: Jemena Gas
 131 909



Utilities: Telstra
 1800 653 935

14.5.2 Responsibilities

The site supervisor will be responsible for ensuring that site personnel are aware of emergency services available. A site safety officer must be available during remedial works.



15 REFERENCES

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19. Australian / New Zealand Standard (AS/NZS) 4602 (1999): *High visibility safety garments*.
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22. Australian / New Zealand Standard (AS/NZS) 2161.1 (2000): *Occupational protective gloves - Selection, use and maintenance*.



FIGURES

- 1 – SITE LOCATION MAP
- 2 - SITE LAYOUT
- 3 – SITE PLAN - EAST
- 4 – SITE PLAN – WEST
- 5 - ACM CONTAMINATED AREAS



APPENDIX A

Proposed Masterplan and Preliminary Architectural Plans



APPENDIX B

Former Borehole and Testpit Logs



APPENDIX C

Laboratory Reports



APPENDIX D

Data Quality Objectives – Validation Program